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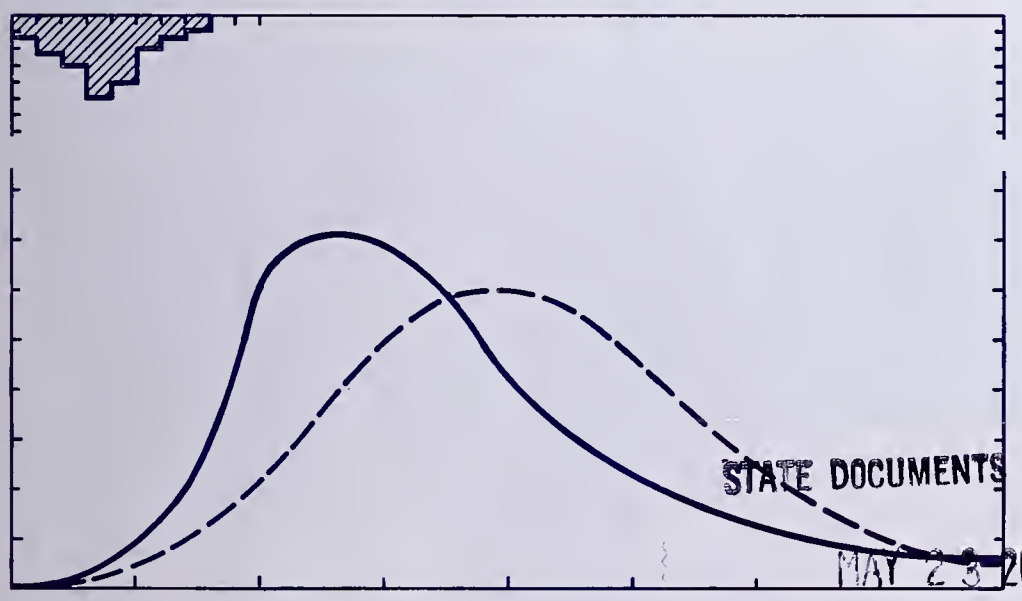
MIDDLE CREEK DAM

FLOOD HYDROLOGY



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MIDDLE CREEK DAM, MONTANA

FLOOD HYDROLOGY

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Under contract with the Montana Department of Natural Resources and Conservation (DNRC), HKM Associates is performing a feasibility study to examine rehabilitation alternatives for Middle Creek Dam, MT (Dam ID No. MT-18). As part of the overall feasibility study, HKM Associates was scoped to perform a design-level flood hydrology study for Middle Creek Dam.

Middle Creek Dam is owned by the State of Montana and is operated by the Middle Creek Water Users Association. The dam is located on Hyalite Creek (Middle Creek) approximately 14 miles south of Bozeman, Montana. The dam and reservoir are located on public land administered by the Forest Service, USDA, Gallatin National Forest.

A Phase 1 investigation of Middle Creek Dam was completed by the Corps of Engineers, Seattle District, in April 1980. The Phase 1 investigation reported the following:

> "On the basis of the field inspection and preliminary hydrologic analysis, Middle Creek Dam does not now conform to inspection guidelines with respect to discharge and/or storage capacities to safely handle the recommended spillway design flood, thus leading to potential for loss of life and property destruction. Because the project cannot safely handle one-half the recommended PMF, it is considered unsafe until the recommended actions are accomplished."

One of the recommendations of the Phase 1 report was to conduct a more detailed hydrologic study to better determine the required spillway capacity. The present design-level flood hydrology study is intended to address that particular recommendation.

Middle Creek Reservoir stores runoff from a drainage basin of 27 square miles. The dam is a 106-foot-high (hydraulic height) earth structure that impounds approximately 10,000 acre-feet (AF) to the dam crest. Storage water (usable capacity without flashboards of 7976 AF) is used primarily for irrigation purposes, but also is used for recreation and as a supplemental source of municipal water supply for Bozeman and Montana State University. A dam breach analysis and flood routing was performed to establish the downstream flood hazards. The results indicate that Middle Creek Dam is located such that its failure would endanger many lives and cause extensive property damage along the downstream reaches of Hyalite Creek. Based on the structure size and hazard rating, Middle Creek Dam is rated as a high hazard project.

To satisfy today's standards and guidelines, Middle Creek Dam should be rehabilitated to accommodate a "probable maximum" inflow flood condition. The present study examined six flood potential conditions, and three of the conditions had multiple study options. The study conditions are as follows:

Study Condition 1 - General Type PMP
(General Category for Study Conditions 1A & 1B)
Study Condition 2 - Major Rain-On-Snow
Study Condition 3 - Probable Maximum Snowmelt
(General Category for Study Conditions 3A, 3B and 3C)
Study Condition 4 - Thunderstorm PMP
(General Category for Study Conditions 4A and 4B)
Study Condition 5 - Principal Spillway Design Flood
Study Condition 6 - Flood Conditions at Canyon Mouth

The purpose for studying numerous flood potential conditions was two-fold: one, to evaluate input parameter sensitivity in

the hydrologic prediction model; and secondly, to examine several representative flood-generating possibilities and thereby confidently select the controlling condition.

Each Study Condition was somewhat unique in terms of what qualified it as a severe event. However, relative to the condition that would have the greatest impact to Middle Creek Dam, the general type probable maximum precipitation (PMP) event (Study Condition 1) is singled out as having the largest instantaneous peak discharge and the largest 72-hour runoff volume. In particular, Study Condition 1A has a peak of 32,400 cubic feet per second (CFS) and a 72-hour runoff volume of 52,500 AF. On the basis of event severity, and according to today's design guidelines, Study Condition 1A is controlling and referred to as the overall project design flood. Because of its derivation, Study Condition 1A will be referenced as the PMF.

Engineers having primary responsibility are presented below.

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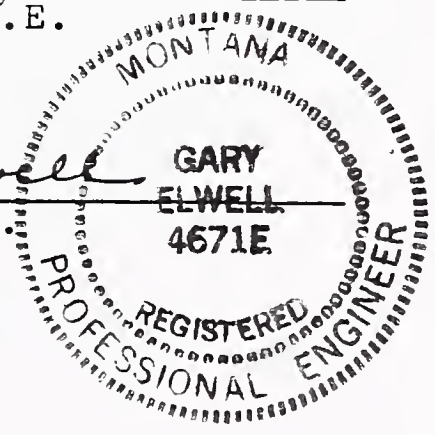

INTRODUCTION

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INTRODUCTION

Flood Hydrology for Middle Creek Dam, Montana is one work component of the overall Middle Creek Dam Rehabilitation Feasibility Study. The primary purpose of the Feasibility Study is to develop recommendations and associated costs to bring Middle Creek Dam up to today's standards for hydrologic, hydraulic, geotechnical, structural and operational adequacy. Specific to the flood hydrology study, the purpose is to develop spillway design floods that can be used to evaluate existing conditions and to design rehabilitation alternatives.

As part of the National Dam Safety Program (P.L. 92-367), Middle Creek Dam was evaluated by the U. S. Army Corps of Engineers (COE) in April 1980. The evaluation was scoped as a Phase 1 investigation which, by definition, was intended to be a basic screening process to ascertain hazard potential and general hydrologic, hydraulic, geotechnical, structural and operational adequacy. The Phase 1 investigation determined that Middle Creek Dam is large in size with a high downstream hazard potential rating, and that certain project conditions did not conform to the National Dam Safety Program recommended guidelines. Particularly as it relates to the flood hydrology and spillway adequacy, the project was found to be seriously inadequate in accommodating the spillway design flood which was identified as the full probable maximum flood (PMF). (Definition: The PMF is the flood expected from the most severe combination of meteorologic and hydrologic conditions that are reasonably possible in the region.) Consequently, the project was rated as unsafe until recommended actions were completed. The present flood hydrology study is a response to one of the recommended actions.

The present study was completed at a "design level" in contrast to the Phase 1 investigations which were of a preliminary nature. Several alternative flood conditions are examined, and

each is detailed in the body of the report. The main objective of the Middle Creek Flood Hydrology Study was to identify hydrologic design conditions for the overall storage project, and for the principal spillway if a combination spillway arrangement is considered. Details of the alternative flood conditions and results are provided in the section entitled Technical Analyses. Conclusions are offered in the final section of the report. Because of the report's technical nature, and because the backup data is so voluminous, all supporting figures and tables, and backup data, are presented in the Appendices. A field reconnaissance report and photo booklet were submitted under a separate cover.

PROJECT DESCRIPTION

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PROJECT DESCRIPTION

The following section describes the design and construction history, project location and physiography, climate and hydrology. Also presented in this section is the size and hazard rating for Middle Creek Dam. The stream has two commonly used names: Hyalite Creek and Middle Creek. In this report, Middle Creek will be used to refer to the dam embankment and Hyalite Creek will be referenced in all other cases.

DESIGN AND CONSTRUCTION HISTORY

Middle Creek Dam was designed and constructed by the State of Montana Department of Natural Resources and Conservation. Construction was initiated in 1939 but temporarily stopped in June 1941. Construction resumed in 1948 and the project was completed in 1951 (U. S. Army Corps of Engineers, 1980).

LOCATION AND PHYSIOGRAPHY

Middle Creek Dam is located on Hyalite Creek approximately 14 miles south of Bozeman, Montana, slightly interior to the northern border of the Gallatin National Forest (see Figures A1 and A2 in Appendix A). The dam and reservoir occupy portions of Sections 15, 22 and 23, T4S, R6E in Gallatin County (see Figure A3 in Appendix A). The project has an approximate latitude and longitude of 45 degrees, 30 minutes and 111 degrees, respectively.

A 27-square mile drainage basin feeds the storage project (see Figure A3 in Appendix A). The basin resides in the Gallatin Range of the Rocky Mountain Physiographic Division (Missouri Basin Inter-Agency Committee, 1971). Elevations within the study basin range from approximately 6700 feet National Geodetic Vertical Datum (NGVD) at Middle Creek Dam to

approximately 10,300 feet NGVD along the Hyalite Ridge which forms the southwestern divide of the contributing watershed. An area-altitude analysis was performed using 15-minute USGS quadrangle maps to characterize the watershed (U.S. Geological Survey, 1955). The results show that nearly two-thirds of the contributing watershed fall within the 7000 to 9000-foot range (see Table A1 in Appendix A). Mean basin elevation above the dam is 8324 feet NGVD. A drainage area summary for the Hyalite Creek Basin is provided in Table A2 of Appendix A.

The primary study watershed is nearly rectangular in shape with the East and West Fork drainages above their respective gages assuming an elongated shape along the longitudinal axis. The East and West Forks of Hyalite Creek both drain in a northerly direction above the gages. The 7.6-square mile contributory area below the gages but above the dam is elongated in the transverse direction (see Figure 3). The drainage basin downstream of the dam but upstream of the Ranger Station gage again assumes an elongated shape in the longitudinal axis with a northwest-southeast orientation.

The East and West Fork drainages above the dam are characterized by steep, rugged terrain along the divides, and talus slopes from the exposed rock faces to the stream channels. There are a few high-mountain lakes in both drainages, and there are scattered clear-cut zones due to timber harvesting. The terrain, climate and soil conditions play an important role in the basin hydrology. A significant amount of precipitation is either absorbed into the soil to be consumptively used by the vegetative cover, or is temporarily lost to the subsurface strata and later shows up as streamflow, or is permanently lost to deep percolation. Overland flow in these mountain drainages is minimal.

The two main feeder streams to the reservoir are the East and West Forks of Hyalite Creek (see Figure A3 in Appendix A). (Note: West Fork of Hyalite Creek also known simply as "Hyalite Creek".) These two streams originate in high snowmelt areas. Stream profiles for the East Fork and West Fork of Hyalite Creek from the watershed divide to the reservoir are plotted in Figures A4 and A5 of Appendix A, respectively. The watersheds for the two forks represent about 72 percent of the total contributing watershed to the reservoir. A single stream channel exists downstream of Middle Creek Dam. Hyalite Creek flows approximately 9 miles through a steep, narrow canyon until exiting the Gallatin Range. Hyalite Creek then flows northwesterly and northerly for about 17 miles before joining the East Gallatin River. The East Gallatin River is a tributary of the Gallatin River which, in turn, is a tributary of the Missouri River. Hyalite Creek is characterized as being slightly incised in the valley alluvium as it travels from the canyon mouth to the East Gallatin River.

CLIMATE

Climate of the study watershed can be classified as moist subhumid (Missouri Basin Inter-Agency Committee, 1971). Similar to other subbasins in the Gallatin River Basin, the Middle Creek Dam watershed typically receives its least precipitation in the summer months of July and August, and the most precipitation in April through June. September generally initiates an increase in precipitation due to fall rainstorms, with snowfall occurring in subsequent months. The snowfall contributes to winter snowpack accumulation. Significant snowmelt above Middle Creek Dam generally does not begin until late April and can last until the early part of July (see Figure A6 in Appendix A). Storms in the form of rain, snow, or

snow-mixed-with-rain events contribute to the peak precipitation months in the spring. Precipitation data for regional stations and for stations located within the study basin are provided in Appendix C. For general information purposes, the mean annual precipitation for Bozeman (MSU station located about 15 miles north of study watershed) is 18.2 inches, for Hebgen Dam (47 miles southwest of study watershed) is 26.9 inches, for Yellowstone Park (34 miles southeast of study watershed) is 16.5 inches, for Lick Creek SNOTEL Station (1.5 miles north of Middle Creek Dam) is 36.5, and for Shower Falls SNOTEL Station (located in the basin) is 54.1 inches.

Temperatures in the basin follow a diurnal pattern and exhibit definite daily and seasonal variations (see Figure A6 in Appendix A). Specific to the typical snowmelt period for the study watershed, the Shower Falls SNOTEL Station has the following approximate long-term mean daily temperatures: for May 1, 29 degrees Fahrenheit (F); for May 15, 37 degrees F; for June 1, 37 degrees F; and for June 15, 42 degrees F. Winter time temperatures are consistently below freezing, with occasional severe cold spells and warm, windy events.

HYDROLOGY

Streamflow within the study watershed is similar to other snowfed river systems in the Rocky Mountains. The snowpack accumulations begin melting as early as April and occasionally extend into the month of July. Typical maximum runoff months are May and June. More specifically, the long-term mean monthly May and June inflow to Middle Creek Reservoir is estimated to be 17,970 acre-feet which represents about 50 percent of the total long-term mean annual inflow volume (see Table B4 in Appendix B). When the month of July is added to

the May and June volume, the 3-month total represents nearly 70 percent of the long-term mean annual volume.

Almost all moisture input, whether it be in the form of rainfall or snowmelt, is absorbed into the soil and reappears in stream channels. Overland flow in these mountain drainages seldom occurs. Typical runoff hydrographs are quite rounded and have a long duration. Peak flows are commonly the result of snowmelt or a combination of rain and snowmelt.

The Hyalite Creek Drainage Basin has been monitored continuously since 1934 at the U. S. Geological Survey (USGS) gaging station referred to as Hyalite Creek at Hyalite Ranger Station near Bozeman (USGS No. 06500000). This gage is located approximately 6-1/2 miles downstream of Middle Creek Dam, and just upstream of the canyon mouth (see Figure A2 in Appendix A). The gage has an upstream drainage basin of 48.2 square miles. Monthly flows for this gage are presented in Tables B2 and B3 (U. S. Geological Survey, 1982) of Appendix B. Flows since construction of Middle Creek Dam are influenced by reservoir operations.

Additional streamgaging in the Hyalite Creek Basin has been done on the East and West Forks of Hyalite Creek (Montana Department of Natural Resources and Conservation, (DNRC) 1982). The current East Fork gage (Montana DNRC No. 41H01000) is located about 1 mile upstream of the reservoir, and has a recorded history at this location of Water Year 1975 to the present. The gage location is shown in Figure A2 of Appendix A and the daily flows are provided in Tables B5 through B12 of Appendix B. The West Fork gage (Montana DNRC No. 41H01500) is located about three-fourths of a mile upstream of the reservoir (see Figure A2). The Soil Conservation Service monitored the West Fork gage on a seasonal basis from 1966 to 1974. The Montana DNRC began servicing the station in Water Year 1975 and

continues to the present. Tables B13 through B21 in Appendix B present the West Fork daily flows. Table B4 in Appendix B presents the estimated monthly inflows to Middle Creek Reservoir.

SIZE AND HAZARD RATING

The COE Phase 1 investigation of Middle Creek Dam established the project rating as large in size with a high downstream hazard potential. The hydraulic height from dam crest to toe is 106 feet, and capacity to dam crest is 10,230 acre-feet (AF). Middle Creek Dam qualifies as a large structure because the hydraulic height exceeds 100 feet.

The previous high hazard potential rating was confirmed by the present investigation. There is a significant housing development located immediately downstream of the canyon mouth and along the Hyalite Creek Flood Plain. A flood routing analysis indicated that numerous homes will be inundated under a severe flooding condition.

BASELINE DATA

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BASELINE DATA

Project baseline information for the flood hydrology study consisted of streamflow, climate, snow and soils data. Each of these categories are detailed below.

STREAMFLOW DATA

Streamflow data consisted of instantaneous peak discharges, daily flows, and monthly flows. A listing of the gages and related statistics is provided in Table B1 of Appendix B. Appendix B also contains tabulated summaries of all baseline streamflow data used in the study.

Instantaneous peak discharges were used to develop magnitude - frequency relationships at Middle Creek Dam and at the Hyalite Creek Ranger Station Gage near the canyon mouth. (see Tables B22 through B25 in Appendix B.) The magnitude-frequency analysis for Hyalite Creek near the Ranger Station was developed using the log-Pearson III statistical technique and the Corps of Engineers publication entitled "Flood Flow Frequency Analysis" (U. S. Army Corps of Engineers, February 1982). The analysis for the Middle Creek Dam location was based on a hydrologic data transfer from the Ranger Station gage to the damsite (see Table B26 in Appendix B). The results are plotted on Figures B1 and B2 in Appendix B.

Daily flows were used to develop actual runoff hydrographs which could then be reconstituted using the HEC-1 hydrologic prediction model. The reconstitution exercise assisted in calibrating key input parameters to the hydrologic model. Daily flows were accumulated on a monthly basis to generate monthly flows. The daily and monthly flows were used in developing base flow estimates. The monthly flows were used in flood volume analyses for this study, and will be used in the water availability study component which will be published as a separate report.

CLIMATE DATA

Climate data was comprised of hourly, daily, monthly, and annual precipitation records. Temperature data consisted of hourly values, and minimum and maximum daily values. The climate stations which provided primary input to the study are listed in Table C1 of Appendix C. Tablulated summaries for the climate baseline data are provided in Appendix C.

Monthly and annual precipitation records were used in developing a perspective of the regional climate and microclimates. All stations listed in Table C1 were included in the perspective. Relative to the hourly and daily values, their primary purpose was to aid in the analysis and reconstitution of actual storm/runoff events and as input to design conditions. Only the SCS SNOTEL Stations (in particular, Shower Falls) were used for hourly and daily values because unsatisfactory statistical correlations were observed between stations within the specific study area and the National Weather Service stations that circumvent the study area. SNOTEL Stations are polled on the average twice a day. These readings differ slightly from the official monthly values shown in Appendix C which are measured by different methods. The identification of microclimates reduced the desirability of using data from the surrounding stations.

Temperature records were used in the reconstitution of actual snowmelt events and as input to design conditions. The Shower Falls and Hebgen Dam Stations provided the required temperature data. Specific to Shower Falls, the SCS Snow Survey polls their SNOTEL sites (one of which is Shower Falls) on the average of twice a day. They have scheduled their polling routine to capture the probable minimum daily temperature (i.e., early morning period) and the probable maximum daily temperature (i.e., mid-afternoon period), from which a mean

daily temperature can be calculated. Table C1 in Appendix C indicates that Shower Falls temperature data is only partially complete during the record period of 1966 to the present. In fact, recorded data was available for less than half of the 18 years.

The present analysis concentrated on the May 1, May 15, June 1, and June 15 mean daily temperature values for Shower Falls. These specific dates were selected because they are strategically distributed throughout the typical snowmelt period. The minimum and maximum daily values were identified for each of the critical dates, and the mean daily value for that date was calculated. The Lick Creek Station was used in the analysis for comparative purposes only because the Shower Falls Station is located within the study basin. More specifically, Shower Falls was selected as a temperature data source for the following reasons:

- The station has an elevation of 8100 feet NGVD, which is very similar to the average basin elevation above the dam of approximately 8600 feet NGVD and a weighted mean basin elevation of 8324 feet NGVD.

- The station is located within the 8000 to 9000-foot elevation zone which represents about one-third of the contributing watershed area (see Table A1 in Appendix A); approximately one-third of watershed is above and one-third is below that zone.

- The station is considered representative of the more significant runoff producing portion of the watershed.

- The station is located within the West Fork of Hyalite Creek basin which has a significant quantitative influence on the total watershed runoff.

Even though the Shower Falls Station was selected for detailed study, it was not considered to have a substantially complete data base. A statistical correlation was performed with the Hebgen Dam mean daily temperature data (1913-83) to obtain an extended period of record at the Shower Falls Station. A separate prediction equation was developed for each date: May 1, May 15, June 1, and June 15. Prediction equations for the transfer are provided in Table C9 of Appendix C. The Shower Falls results of the data extension are shown in Tables C10 through C13 of Appendix C. The extended records provide a long-term estimate of the minimum, maximum and mean for the Shower Falls mean daily temperature on critical dates within the snowmelt period.

Another temperature analysis of particular interest was a "moving average" investigation of recorded Hebgen Dam mean daily temperature values for the months of May and June. The objective of this study was to examine actual 3-day, 7-day, 14-day, 21-day and 28-day mean daily temperature sequences which could first be used to develop concurrent Shower Falls values and then subsequently be used in critical temperature sequencing for design conditions. May and June Hebgen Dam data was examined for calendar years 1970 through 1983.

The 14-year period was selected because temperature records were continuous. Additionally, it was felt that the period is sufficiently long and adequately representative to be classified as "reasonably representative" of long-term conditions. Hebgen Dam mean daily sequential temperature values for May 1 through June 30 for the years 1970 through 1983 are presented in Tables C14 through C27 in Appendix C.

(Note: May and June were selected because the typical snowmelt period falls within this 61-day period.) The following conditions were quantified using the Hebgen Dam data:

- maximum recorded 3-day temperature sequence for May, for June, and for the 2 months combined;
- maximum recorded 7-day temperature sequence for May, for June, and for the 2 months combined;
- maximum recorded 14-day temperature sequence for May, for June, and for the 2 months combined;
- maximum recorded 21-day temperature sequence for May and June, combined;
- maximum recorded 28-day temperature for May and June, combined.

Tables C28 through C36 in Appendix C present the Hebgen Dam maximum temperature sequences. The tabular presentations include the year in which they occurred, the actual sequence, the moving average for the sequence, and the number of degree days associated with the sequence.

To accomplish the objective of generating critical temperature sequences at the Shower Falls Station, a data transfer of the Hebgen Dam data was required. Two approaches were taken: one approach examined the relationship of mean daily temperatures at the Hebgen Dam and Shower Falls Stations for May 1, May 15, June 1 and June 15; and the second approach considered the elevation difference between the two stations and applied an expected lapse rate. Specific to the first approach, it was found that the average of the mean daily temperatures for May 1, May 15, June 1 and June 15 for the two stations differed by as little as 6 degrees F and as much as 14 degrees F. The second approach recognized the typical lapse rate in mountainous areas to be between 3 degrees F to 5 degrees F per 1000 feet elevation change (Linsley, Kohler and Paulus, 1975).

The elevation difference between the two stations is 1611 feet (8100 - 6489 = 1611 feet). Hence, temperatures can typically range from 5 degrees F to 8 degrees F cooler at the Shower Falls Station. It was concluded that a 7-degree reduction from the Hebgen Dam temperature data will fall within the typical range and likely be at a conservative level relative to snowmelt determinations. Tables C37 through C45 in Appendix C present the synthesized maximum temperature sequences, moving average estimate, and degree days for the Shower Falls Station.

SNOW DATA

Five SCS Snow Survey Stations were examined for snow data, and they are as follows: Arch Falls, Devils Slide, Hood Meadow, Lick Creek and Shower Falls. All stations are located within the study watershed except for Lick Creek which is located approximately 1-1/2 miles north of Middle Creek Dam (see Figure A3 in Appendix A). Pertinent station statistics are given in Table D1 of Appendix D. Snow Data for all stations is provided in Tables D2 through D15 of Appendix D.

The snow data was used in actual event reconstitution, in the dimensionless snowmelt hydrograph analysis, and for specific design conditions. Statistical correlations were performed to establish similarities, dissimilarities, and representativeness amongst the stations. As noted in the subsection entitled Climate Data, Shower Falls was selected as the key snow survey station. The reasons for its selection for temperature data also apply to snow data.

The primary study element of the available snow data was snow water equivalent (SWE). Recorded SWE data for Shower Falls is tabulated in Table D13 of Appendix D. Maximum yearly SWE at the Shower Falls Station generally occurs in May or June.

Because May and June are also the primary snowmelt months, only these 2 months received a detailed examination. For the 19 years of measured record (1965-83), the minimum SWE for May is 17.1 inches and the maximum SWE for May is 39.5 inches (see Table D13 of Appendix D). The minimum and maximum SWE for June are 13.0 inches and 42.6 inches, respectively. The snow data examination was further reduced in scope to only the month of June because June will give higher values at the Shower Falls Station. Also, the final magnitude-frequency values for June could conceivably apply in late-May.

Statistical correlations were performed on the measured Shower Falls SWE data in an attempt to extend the 19 years of data. The purpose of extending the measured data was to hopefully improve the statistical reliability and representativeness of the results. Consideration was given to correlating Shower Falls SWE data with Hebgen Dam precipitation data, with extended monthly (June) streamflow data for the two gaging stations upstream of Middle Creek Reservoir, and with Devils Slide SWE data. The preferred correlation was the one which used extended June streamflow data for the East and West Forks of Hyalite Creek. The prediction equation and relevant statistics are provided in Table D16 of Appendix D. Table D17 in Appendix D lists the total June SWE data base for Shower Falls, with the years 1931 to 1964 reflecting synthesized data and the years 1965 to 1983 being actual measured data.

A log-Pearson III statistical analysis was performed on the extended Shower Falls SWE data set to establish a magnitude-frequency relationship (U. S. Army Corps of Engineers, February 1982). The results are described and plotted in Figure D1 of Appendix D. These same results were used as input to design study conditions that required specific snowmelt calculations. The section of this report entitled

Technical Analyses details input parameter selection and quantification.

SOILS DATA

The two sources of soils data were the Soil Conservation Service and the U. S. Forest Service. SCS data consisted of soil moisture and soil temperature measurements for the period 1965-78 at the Lick Creek Snow Survey Station (U. S. Soil Conservation Service, 1978). Soil moisture data was analyzed in terms of soil moisture, and soil moisture condition as a percent of capacity. The Lick Creek Station data for these two conditions are summarized in Tables E1 and E2 of Appendix E. Table E2 was developed using the SCS computed capacity of 18.8 inches.

Lick Creek Station soil temperature conditions were examined for two soil moisture units: Unit #1 which has an average depth below ground surface of 3 inches, and Unit #2 which has an average depth of 10 inches below the surface. Unit #1 and Unit #2 soil temperature data are summarized in Tables E3 and E4 of Appendix E, respectively. The soil moisture and soil temperature data were used to gain an understanding of seasonal soil conditions, and thus, aided in quantifying design loss rates in the hydrologic prediction model.

Complete hydrologic soil group mapping of the study watershed was obtained from the U. S. Forest Service. The maps are in unpublished form, but were made available for this study. The different soil groups within the watershed were planimetered and arithmetically weighted to arrive at a predominate soil group. It was found that a little over 73 percent of the soils fall within Group B, nearly 21 percent are in Group C, and the balance are divided between Groups A and D. The "weighted average" soil group was determined to be Soil Group B. Results

of this exercise are presented in Table E5 of Appendix E. The hydrologic soil group information was used in assigning moisture loss rates in the hydrologic prediction model.

TECHNICAL ANALYSES

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TECHNICAL ANALYSES

GENERAL

The following section describes the technical analyses performed to develop alternative flood conditions. These analyses relate directly to flood runoff determinations; whereas the preparatory analyses were highlighted in the previous section entitled Baseline Data.

The Technical Analyses section begins with a discussion of unit hydrograph development, followed by a discussion of the dimensionless snowmelt hydrograph technique and its applicability to the present study. The six different study conditions are then described. Most attention was given to the likely controlling conditions which were Study Condition 1 - General Type PMP, and Study Condition 3 - Probable Maximum Snowmelt. All conditions are presented here to convey the comprehensiveness of the study, and to accommodate an independent and objective evaluation of the analyses and results.

UNIT HYDROGRAPH DEVELOPMENT

An obvious approach to quantifying the project design flood was the development of a unit hydrograph for the study basin. Unit hydrographs can be developed from actual runoff events in the basin, by transposition from hydrologically similar basins, or by synthesis. Two major difficulties in unitgraph development were faced in this study: one, all measured runoff events of any significance in the basin, and the region for that matter, have had a mixed influence of rainfall and snowmelt; and secondly, the present study deals with severe floods which are a significant departure from what has occurred

within relative recent time in the basin. Though somewhat related, these two difficulties were isolated in developing an acceptable approach.

Transposition will be discussed briefly. A search was made for regional storm/runoff data that could be used in the present study. Storm/runoff data was reviewed and contacts were made with various agencies such as the USGS (Helena and Billings offices), the National Weather Service (Great Falls office), the SCS (Bozeman office), and others. Of particular interest was a very severe rainfall event with little or no snowmelt influence. The isolation of rainfall runoff events from snowmelt events was necessary to best quantify key hydrological variables and shape the hydrograph. Very little success was achieved in finding such an event. Hence, the desirability of using transposition was relaxed in favor of other methods.

Review of existing climate and hydrologic records indicated that total reliance on historic events for severe floods was unsatisfactory. It became apparent that what the Hyalite Creek watershed has historically exhibited may not be characteristic of conditions during a severe rainstorm event. The years when adequate records are available reflect relatively mild runoff conditions. Further, the review of available synthetic unit hydrograph techniques (i.e., SCS, Snyder and Clark) and conversations with other hydrologists led to the conclusion that synthesis alone was also unsatisfactory. It was concluded, however, that the results of historic event reconstitution and synthetic unit hydrographs could lead to a reasonably satisfactory result.

The final study technique involved reconstitution of four historic runoff events above Middle Creek Dam by using the optimization routine in the HEC-1 computer model (U.S. Army Corps of Engineers, 1981 and 1982). The Clark Unitgraph was

selected as the preferred synthetic unit hydrograph. The HEC-1 optimization routine quantified key input parameters in the model such that the four historic events were best simulated. (Note: The optimization and Clark Unitgraph technique was reviewed with hydrologists at the Sacramento and Seattle District of Corps of Engineers, and the Missouri River Basin Forecast Center of the National Weather Service in Kansas City, MO.) The four historic events were 1979, 1980, 1981 and 1982. Each event was analyzed separately. The 1980 event was examined on a subbasin basis as well as a total drainage unit. These events were selected because reasonably good climatologic and hydrologic data are available.

Input data to the HEC-1 model included precipitation, temperature, snow water equivalent, base flow and recorded streamflow. Actual precipitation, temperature, and beginning snow water equivalent data for the Shower Falls Station was input. Also, recorded runoff data at the East and West Forks of Hyalite Creek gaging stations were input. The key variables that were optimized during the analysis are as follows: time of concentration (TC), a basin storage coefficient (R), and loss rates for both rainfall and snowmelt.

The results of the reconstitution are given in Table A3 of Appendix A, and they show that calculated volumes differ by less than 1 percent from the actual observed values in all cases. For the peak values, the difference between calculated and observed range from about 2 percent to 33 percent. All but one of the peak value differences are within 25 percent, which is consistent with the accuracy of other data used in the study. These results were felt to be satisfactory. Hence, historic event reconstitution resulted in Clark Unitgraph and loss function parameters that are representative for events that typically occur during the snowmelt period in the study watershed.

In order to better reflect severe hydrologic conditions, the key hydrologic parameters (i.e., TC, R and loss rates) were modified where appropriate. Input parameter and unit hydrograph details are presented for each study condition described in this section.

DIMENSIONLESS SNOWMELT HYDROGRAPHS

Consideration was given to the dimensionless snowmelt hydrograph as a method to synthesize severe snowmelt runoff hydrographs. The analysis was based on an article by Dr. Al Cunningham (Cunningham, 1977), and on updated work by Cunningham and a graduate student at Montana State University (Spangrude, 1979). Four historic events were examined within the study watershed: 1979, 1980, 1981 and 1982. These events were chosen because they had reasonably good rainfall, temperature, snow water equivalent, and runoff data available. In all cases, using the Cunningham article data 1977, significant scatter was observed even in the dimensionless plots. The scatter increases the uncertainty in defining a representative dimensionless curve that can be used for synthesis of design event conditions. A method was examined which was intended to reduce the amount of scatter, and hence, improve the reliability of the dimensionless curve (Spangrude, 1979). The method was reasonably successful at reducing the scatter however, the results of applying the dimensionless snowmelt hydrograph to severe design conditions appeared less satisfactory than the approach described earlier in the subsection entitled Unit Hydrograph Development. It appeared that the 1979 through 1982 events were too far removed from the probable maximum snowmelt condition, and hence, do not form a good basis for dimensionless hydrograph formation. More smoothing of the temperature and snowmelt factors was evident in the dimensionless snowmelt hydrograph case than for the unit hydrograph case. Because it became apparent that this probable

maximum snowmelt case was not going to be the controlling condition for the Middle Creek project, no further work effort was applied to the dimensionless snowmelt hydrograph.

STUDY CONDITION 1 - GENERAL TYPE PMP

The most significant element of Study Condition 1 is that it includes the general type probable maximum precipitation (PMP). (Definition: Probable maximum precipitation is the theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. American Meteorological Society, 1959.) The general type PMP has a 72-hour duration and was derived using techniques to be included in Hydrometeorological Report 55 (HMR 55). HMR 55 is the result of a joint effort between the National Weather Service, the COE, and the U.S. Bureau of Reclamation (USBR). HMR 55 was not in published form at the time of this study however, the USBR, Denver Engineering and Research Center, generated depth-duration values for the 72-hour storm using the unpublished document. The technique and results were reviewed with HKM Associates and the Montana DNRC at the Denver E&R Center, and subsequently released for use in the Middle Creek Dam Flood Hydrology Study. The 72-hour accumulated depth is 34 inches. A plot of the 72-hour PMP depth-duration relationship is shown in Figure A7 of Appendix A. This depth-duration relationship is assumed applicable for the months of June through August. For the month of May, the values shown should be reduced by applying a factor of 80 percent to each increment as recommended by the USBR.

The depth-duration incremental values from HMR 55 were rearranged to form a critical design distribution. Three different design distributions were investigated to evaluate sensitivity, and they include: the actual storm of June 1964

(a.k.a. the Gibson Dam Storm) at the Summit, MT climate station; pattern(b) from page 204 of HMR 43; and pattern(e) from page 204 of HMR 43 (see Figure A8 of Appendix A for patterns (b) and (e). The final design distribution is based on pattern (b) contained in HMR 43 (Ref. U.S. Department of Commerce, 1966) which is appropriate when no predominate rainfall pattern is evident from past records (National Research Council, 1983). The 30-minute precipitation increments developed from the 72-hour PMP depth-duration curve were arranged in 6-hour blocks according to pattern(b). Within 6-hour blocks, the 30-minute increments were arranged in ascending order up to the maximum 6-hour block and in descending order thereafter. Within the maximum 6-hour block, the maximum 30-minute increment was placed immediately after midway and the remaining 30-minute increments were placed forward and then backward in an alternating manner. The final design pattern used in the HEC-1 model is shown in Tables A4 and A5 of Appendix A.

Inadequate baseline data was available to perform a detailed synthesis of a snowmelt event concurrent with the 72-hour PMP. The primary deficiency for a snowmelt calculation was 30-minute temperature data. Instead of attempting a detailed incremental snowmelt calculation, the pre-snowmelt period base flow was indexed upward to reflect a typical level of flow during the month of study for the PMP analysis. (Note: Base flow preceding the primary snowmelt period typically amounts to approximately 25 cubic feet per second (cfs) as a combined total for the East and West Forks of Hyalite Creek at their gages. The base flow reflects rainfall and other sources of runoff.) Because the general type storm can occur in June and because June typically is the largest runoff month, the "indexed" base flow estimate was established to be the long-term mean monthly flow for June, averaged on a daily basis, then escalated by a multiplier of 1.5 as a conservative

measure. The long-term mean monthly June inflow to the reservoir is 10,682 AF, which amounts to an average daily flow of just under 180 cfs. After escalating by the 1.5 factor, the "indexed" based flow was assumed to be 260 cfs. This "indexed" base flow condition has the snowmelt process (i.e., typical melt rates and losses) included and therefore avoids the need for special snowmelt considerations coincident with the 30-minute duration analysis for the 72-hour PMP.

The two key variables for the Clark Unitgraph were identified earlier as being the time of concentration (TC) and a basin storage coefficient (R). Both of these variables had to be adjusted from the reconstitution exercise to account for severe conditions. The time of concentration was substantially reduced to reflect the higher rainfall intensities, greater rainfall amounts, and the improved hydraulic efficiencies for overland and channel flow. The design time of concentration was determined using the overland flow technique where an average, representative flow velocity was assigned for non-channel travel lengths and for channel reaches. Applying the velocities to the respective travel lengths resulted in a 1.5-hour time of concentration. Time of concentration calculations are provided in Table A6 of Appendix A.

Relative to the basin storage coefficient (R), significant reductions were made to reflect severe conditions. This coefficient relates to the surface runoff phenomena rather than subsurface losses and interflow. The modifications to R were based on input from Corps of Engineers and USBR hydrologists, and familiarity with the basin. Different values of R were examined to determine result sensitivity. Two values were finally selected, and each was input to the HEC-1 model to generate a design runoff hydrograph. Study Condition 1A uses an R of 5 which provided a peak discharge consistent with USBR

regional PMF estimates. The Corps of Engineers recommended an R of 8-12 for similar basins, therefore, an R of 10 was used for Study Condition 1B. Before presenting the results, other input parameters and assumptions to Study Condition 1 will be discussed.

A key parameter in determining the runoff hydrograph is the loss function, including initial and continuous losses. Losses for Study Condition 1 were based on the soil types, the results of the reconstitution exercise, and likely antecedent soil moisture conditions. Because the total snowmelt process (i.e., melting, losses and runoff) was assumed to be included in the "indexed" base flow, the only HEC-1 loss function that needed to be addressed in Study Condition 1 was precipitation. Initial losses were set of 0.1 inch and the continuous losses set at 0.02 inch per hour. These losses were the same for Study Conditions 1A and 1B.

Study Condition 1 input parameters and results are summarized in Table A7 of Appendix A, and the flood hydrographs are plotted in Figure A9 of Appendix A. Study Condition 1A and 1B calculation summary is shown in Tables A4 and A5, respectively. For Study Condition 1A, the flood event has a peak discharge of 32,400 cfs which reduces to an average runoff of 1200 cfs per square mile above the dam. Total 72-hour runoff volume for Study Condition 1A is 52,500 AF. Study Condition 1B has a peak discharge of 22,200 cfs, or 822 cfs per square mile, and yields a total 72-hour runoff of 45,900 AF. The peak discharge rates for Study Condition 1 are the largest of all study conditions examined. Note that either of these flood hydrographs would overtop the existing dam.

STUDY CONDITION 2 - MAJOR RAIN-ON-SNOW

Study Condition 2 reflects relatively severe inputs to the HEC 1 model, but not as severe as a PMP or a probable maximum snowmelt condition. Inputs to Study Condition 2 are base flow, beginning snow water equivalent, precipitation pattern and amounts, temperature sequence, melt factor, base temperature, the time of concentration and storage coefficient for the Clark Unitgraph, and the loss function. Each will be described in more detail below.

A pre-snowmelt period base flow was selected to be 25 cfs. This value reflects the combined East and West Fork Hyalite Creek flow which commonly occurs immediately preceding the snowmelt period, but indexed upward by a factor of 1.5 to account for inflow downstream of the gages but upstream of the reservoir. The base flow amount, prior to indexing, was established using hydrograph plots and by reviewing the tabulated streamflow data at the gages (Figure A6 of Appendix A and Tables B5 through B21 of Appendix B).

The beginning snow water equivalent was assigned as 42.6 inches. This amount is the maximum value of record at the Shower Falls Snow Survey Station, and it occurred in June 1975. For the purposes of this study, the June value was moved ahead to May 1 which is assumed to be the beginning of this study condition analysis. This is justified because the Shower Falls records indicate that the maximum yearly SWE generally occurs in May or June.

The precipitation pattern and amounts were taken directly from the 1981 storm during May and June. The precipitation data for May and June is listed in Table A8 of Appendix A. Each monthly total exceeds the mean values for the month, and according to a

statistical analysis of the recorded data, each monthly value has an approximate recurrence interval of 20 years. Specific to the precipitation amounts during the widely publicized storm of May 22-23, 1981 (Parrett, Omang and Hull, 1982), the actual recordings at the Shower Falls Station did not indicate significant increments or totals in comparison to the published magnitude-frequency estimates in NOAA Atlas II (Miller, Frederick and Tracy, 1973). The total rainfall accumulation at Shower Falls from May 20-22 was 2.5 inches. By comparison, the 2-year, 24-hour value is 2.20 inches and the 5-year, 24-hour value is 2.80 inches (Miller, Frederick and Tracy, 1973).

A moderately severe temperature sequence was selected for the May-June melt period. Mean daily temperatures were held below the 32-degree base temperature for the first 7 days of the study period. From the beginning of the melt period through completion of the analysis, mean daily temperatures were stacked using the results of the mathematical and statistical analyses described in the Baseline Data section. The sequence and description of each temperature value and/or block of temperatures are indicated in Table A9 of Appendix A. The temperatures for the study period are also shown in Table A8 of Appendix A as part of the HEC-1 data summary.

The degree day method of analysis was used for snowmelt calculations. The base temperature for degree day determinations was selected as 32 degrees F. A melt factor of 0.07 inch per degree day was assumed for the entire melt period. This value is slightly above Chow's average spring snowmelt of 0.05 inch per degree day (Chow, 1964), but within the range suggested by the SCS Snow Survey Group for the May-June period.

Using the snowmelt related factors described above, the melt period (the time for the snowpack to totally dissipate) spanned 43 days. The measured records at the Shower Falls Station from 1976 to 1983 indicate that the primary snowmelt period lasted for as little as 46 days and as long as 66 days, with the mean being 55 days. Hence, the 43-day period for Study Condition 2 is slightly less than the minimum observed in recent time.

Because Study Condition 2 is primarily a snowmelt-type event, the Clark Unitgraph parameters of TC and R were based on the historical event reconstitution results. The parameters TC and R were adjusted to reflect a 50 percent increase in the unitgraph peak relative to the reconstituted values. This adjustment accounts for anticipated hydrologic changes due to event severity. All Clark Unitgraph parameters for Study Condition 2 are shown in Table A7 of Appendix A.

The loss rates for Study Condition 2 are based on the reconstitution results. The reconstitution losses are shown in Table A3 of Appendix A and the design losses are shown in Table A7 of Appendix A. For this design condition, the losses were set as follows: 0.5 inch for initial losses, 0.01 inch per hour for precipitation only losses, and 0.03 inch per hour for combined snowmelt and precipitation losses.

The peak discharge for Study Condition 2 was determined to be 989 cfs which has an average recurrence interval of 400 years (see Figure B2 in Appendix B.) The 60-day volume was calculated to be 47,400 AF. The flood hydrograph is plotted on Figure A10 of Appendix A. According to Figure B5 in Appendix B, the runoff volume exceeds the 1000-year recurrence interval estimate for May plus June which was determined to be 39,500 AF.

STUDY CONDITION 3 - PROBABLE MAXIMUM SNOWMELT

The climatologic and hydrologic characteristics of the study watershed necessitated the need to examine a probable maximum snowmelt case. There are no specific guidelines available in the literature for developing a probable maximum snowmelt hydrograph. In general, however, the guidelines discuss maximizing the inputs similar to a PMP exercise. Key inputs to this analysis are similar to those described for Study Condition 2, but with significantly different value assignments.

The study period for Study Condition 3 was assumed to be contained within May and June. A pre-snowmelt period base flow was selected to be 25 cfs. This value is the same as for Study Condition 2 and reflects the base flow preceding the snowmelt period. It is not a function of the snowmelt event that follows.

The upper limit of snow accumulation in the watershed was estimated using statistical methods (World Meteorological Organization, 1972). The beginning snow water equivalent for May 1 was 64 inches, which is estimated to have a recurrence interval of 1000 years (see Figure D1 in Appendix D). The 1000 year recurrence interval was selected as being reasonably severe.

The 1980 May and June precipitation amounts and sequence at the Shower Falls Station were used. May's 1980 monthly precipitation was approximately 40 percent greater than the mean, and June's monthly precipitation was approximately average. It was felt that a more severe precipitation input regime could not be reasonably justified as occurring coincident with the specific design temperature sequence and melt factors.

Temperature sequencing played a key role in this study condition. The melt process was purposefully delayed through the preceding months and until 8 days into May. From May 8th until the snowpack was dissipated, a critically severe arrangement of mean daily, maximum 3-day, and maximum 7-day temperatures were used. The sequencing and description of each sequence block are provided in Table A10 of Appendix A. Design temperature data is also shown in Tables A11, A12 and A13 of Appendix A as part of the HEC-1 data summary. To establish reasonable bounds on the temperature sequence, maximum 7, 14, 21 and 28-day sequences within the design condition were compared to actual historic occurrences during the period 1970-83. The results of this comparison are provided in Table A14 of Appendix A. Guidelines for temperature sequencing were furnished by the World Meteorological Organization entitled "Estimation of Maximum Floods (World Meteorological Organization, 1972).

Three different melt factors were applied to the degree day method of analysis, and they are as follows: 0.09 inch per degree day (Study Condition 3A), 0.10 inch per degree day (Study Condition 3B), and 0.15 inch per degree day (Study Condition 3C). The results for the three different melt factors are tabulated in Table A7 and plotted in Figure A11, both in Appendix A. The 0.09 inch per degree day value is considered a minimum because it falls midway between the SCS Snow Survey suggested range for exposed and timbered areas of 0.08 and 0.10 inch per degree day at June 15. The 0.10 value matches the upper limit suggestion by the SCS for exposed areas on June 15. A maximum value of 0.15 inch per degree day was selected as a condition that exceeds the SCS range but falls below Chow's suggested maximum of 0.20 inch per degree day (Chow, 1964). The base temperature for degree day calculations was again selected as 32 degrees F.

The melt period under these conditions was 41 days for Study Condition 3A, 37 days for Study Condition 3B, and 28 days for Study Condition 3C. Recalling that the minimum melt period of record from 1976 to 1983 is 46 days, the above results are 11 percent, 20 percent, and 39 percent shorter, respectively.

Study Condition 3 is also primarily a snowmelt-type event, consequently the Clark Unitgraph parameters were quantified the same as described for Study Condition 2. All Clark Unitgraph parameters for Study Condition 3 are shown in Table A7 of Appendix A.

Study Condition 3 losses are the same as selected for Study Condition 2, and are considered to adequately reflect the loss function even during severe conditions. The initial loss was 0.5 inch, followed by a constant precipitation related loss of 0.01 inch per hour and a constant combined snowmelt and precipitation loss of 0.03 inch per hour.

Flood runoff peak discharge rates for Study Conditions 3A, 3B and 3C were determined to be 1260 cfs, 1410 cfs, and 1910 cfs, respectively. According to Figure B2 of Appendix B, the 1260 cfs value is 10 percent greater, 1410 cfs is 23 percent greater, and 1910 cfs is 66 percent greater than the 1000-year flood peak prediction. Relative to runoff volume, the values ranged from a minimum of 69,900 AF for Study Condition 3A to 86,700 AF for Study Condition 3C. These two volume results exceed the 60-day duration, 1000-year volume prediction by 77 percent and 219 percent, respectively (see Figure B5 in Appendix B).

STUDY CONDITION 4 - THUNDERSTORM PMP

Study Condition 4 relates specifically to a thunderstorm type PMP. The thunderstorm PMP has a 6-hour duration. Similar to

the 72-hour general PMP, the thunderstorm depth-duration values were obtained from the U.S. Bureau of Reclamation, Denver Engineering and Research Center. The Bureau used the techniques soon to be released in a hydrometeorological report referred to as HMR 55. A plot of the 6-hour PMP depth-duration relationship is shown in Figure A12 of Appendix A. The depth-duration relationship is assumed applicable during the months of May through September. For this study, the thunderstorm PMP was placed in the month of June (Study Condition 4A) and in the month of August (Study Condition 4B) to examine input parameter sensitivity and seasonal effects.

The depth-duration incremental values from HMR 55 were rearranged to form a critical design distribution. A variety of thunderstorm precipitation patterns were reviewed. The selected pattern is based on Table A-8, Appendix A, Design of Small Dams (U.S. Bureau of Reclamation, 1973). The 15-minute time increments obtained from the depth-duration curve falling within the two highest 1.5-hour blocks were arranged according to the pattern found in Table A-8 of Design of Small Dams. The 15-minute increments in the third highest block were arranged in ascending order leading up to the USBR pattern and the remaining 15-minute increments were arranged in descending order on the descending limb of the hyetograph. The final design values and distribution for the thunderstorm PMP are shown in Tables A15 and A16 of Appendix A.

Similar to Study Condition 1, a detailed incremental snowmelt calculation could not be justified. To account for the snowmelt process in June, and potential runoff in August that reflects some type of antecedent storm/runoff condition, the base flows were indexed above pre-event base levels. More specifically, the average daily flow associated with the long-term mean monthly runoff for June was determined, then

indexed by a factor of 1.5 (see discussion for Study Condition 2). For the summer/fall period, the average daily flow for the long-term mean July monthly runoff was determined, then indexed by a factor of 1.5. July was selected in lieu of August because it gives a more conservative answer and because July is a candidate month for a summer/fall thunderstorm event. The "indexed" based flows are 260 cfs for June and 135 cfs for August. By incorporating the "indexed" base flows, it was felt unnecessary to superimpose a snowmelt or special antecedent condition on the study watershed coincident with the thunderstorm PMP.

The Clark Unitgraph parameters TC and R were modified to reflect severe conditions specific to the thunderstorm PMP. The TC was calculated using the overland flow technique. Time of concentration for both the June and August events were calculated to be 1.5 hours. Time of concentration calculations are given in Table A6 of Appendix A. The storage coefficient, R, was set at 10 as recommended by Corps of Engineers hydrologists.

Besides the "indexed" base flows, the primary distinction between the June thunderstorm event and the August event is the loss function. The June event was assumed to occur on a "wet watershed" and the August event was assumed to occur on a "dry watershed". Both events had a common initial loss of 0.1 inch, but the June event had a constant loss rate of 0.02 inch per hour and August had a constant loss rate of 0.15 inch per hour. The 0.15 inch per hour relates to a lower limit minimum loss rate for soils in Hydrologic Soils Group B (U.S. Bureau of Reclamation, 1973).

Study Conditions 4A and 4B results are summarized in Tables A7, A15 and A16 of Appendix A. The flood hydrographs are plotted in Figures A13 and A14 of Appendix A. For the June event, the peak discharge is 11,700 cfs and the 6-hour runoff volume is 5220 AF. August had slightly lower values, primarily due to loss function differences. For August, the peak discharge is 10,800 cfs and the 6-hour volume is 4760 AF. The peaks reduce to 433 cfs per square mile and 400 cfs per square mile, respectively. The thunderstorm peak results are approximately one-half those determined for the general type storm/runoff event in Study Condition 1. No statistical frequency assignment for the peak discharges is available for either Study Condition 1 or 4. Study Condition 4 volumes are relatively small in terms of total accumulation. Flood routing through the Middle Creek storage facility will be accomplished at a later date. The routing will determine the significance of the thunderstorm volumes.

STUDY CONDITION 5 - PRINCIPAL SPILLWAY DESIGN FLOOD

The Flood Hydrology Study was scoped such that a range of events would be determined for the principal spillway design flood, and the final selection of the controlling event would be made during the rehabilitation design stage. The final sizing criteria is a function of costs, operational plans, policy decisions and political decisions, in addition to hydrology and hydraulics. Consistent with this scope, it was considered appropriate to analyze a 100-year, a 500-year, and a 1000-year event. In reviewing the completed study condition results and the peak discharge and runoff volume frequency predictions, it was found that rainfall-type and snowmelt-type events should be considered separately. (Note: The magnitude-frequency results for peak discharge rates are shown in Figure B2 of Appendix B and the magnitude-frequency results for May, June, and May plus June volumes are shown in Figures

B3, B4 and B5 of Appendix B, respectively.) Both the peak discharge and volume analyses were significantly influenced by snowmelt-type events because a severe rainfall event has not occurred within the recorded history of the basin. Additionally, the same frequency does not yield a common event peak and volume. In other words, the prediction for the 100-year peak discharge event does not necessarily match the 100-year volume event. The consequence of this observation is that the present study does not generate specifically a 100-year, a 500-year, or a 1000-year event. What is provided, however, is a reference to two study conditions that have already been analyzed to provide a general perspective of a principal spillway design flood.

The present study assumes that the principal spillway will provide its most utility in accommodating snowmelt-type runoff events. The peak discharge of 931 cfs for Study Condition 2 approximates the 500-year recurrence interval peak of 1006 cfs, and the peak discharge of 1220 cfs for Study Condition 3A slightly exceeds the 1000-year recurrence interval peak of 1150 cfs. The calculated volumes for Study Conditions 2 and 3A are much greater than the "May plus June" 100-year and 500-year predicted volumes (see Table A7 in Appendix A and Figure B5 in Appendix B). The flood hydrographs for Study Conditions 2 and 3A can be used as "starters" in the principal spillway design process and modified accordingly to generate specifically a peak sensitive or a volume sensitive result. If it is desired to have a peak sensitive result, the peak value will carry the frequency assignment. If volume is the primary concern, then runoff volume will assume the reference frequency.

An example of a 100-year flood hydrograph is not identified in the present study because the peak discharge values for the two examples are already very low in comparison to existing spillway capacity. (Note: COE Phase 1 report indicates an

existing maximum spillway capacity of 5600 cfs.) The 100-year instantaneous peak discharge at the dam was determined to be 734 cfs (see Figure B2 of Appendix B), but a complete hydrograph was not developed. If a 100-year event is desired at the rehabilitation design phase, the specification can be accommodated using the HEC-1 computer model with appropriate input parameter assignments.

STUDY CONDITION 6 - FLOOD CONDITIONS AT THE CANYON MOUTH

Flood hydrology conditions at the mouth of Hyalite Canyon were desired for the purposes of the flood inundation study and the benefit-cost study, each of which are components of the overall Middle Creek Dam Feasibility Study. The probable maximum flood (PMF) estimate at the canyon mouth will be compared to the routed dam breach condition to establish the importance of safely routing a PMF at Middle Creek Dam. The PMF hydrology conditions at the canyon mouth were developed at a lower level of detail than at the damsite. The magnitude-frequency results developed using gaged records at the Hyalite Creek gaging station near the canyon mouth were studied on a comparable level as those developed at the damsite. However, it should be recognized that the magnitude-frequency results are influenced by available records which do not include a severe rainfall event.

The PMF estimate at the canyon mouth was made by transferring the damsite result to the gage near the canyon mouth using drainage area proportionality to an exponential power of 0.7 (Parrett and Omang, 1981). Specifically, Study Condition 1A peak discharge of 32,400 cfs was transferred from a 27-square mile drainage basin to 48.2 square miles with the result being 48,600 cfs. This result is felt to be conservatively high because no consideration was given to special storm positioning, areal reduction of the PMP amounts, etc. These

special study elements are not considered important for the canyon mouth estimate because the breach condition controls.

The results of the statistical analysis using the gaged records and the log-Pearson III technique are plotted in Figure B1 of Appendix B. The 100-year discharge for Hyalite Creek at the Ranger Station gage, which is near the canyon mouth, was determined to be 1120 cfs. The 200-year and 500-year discharges were determined to be 1280 cfs and 1510 cfs, respectively.

CONCLUSIONS

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CONCLUSIONS

Middle Creek Dam is a large, high hazard facility and all reasonable efforts should be made to rehabilitate the project to a "probable maximum condition". The present study found Study Condition 1, specifically Study Condition 1A, to have the largest instantaneous peak discharge and largest 72-hour volume. The peak was 32,400 cfs, or 1200 cfs per square mile. The 72-hour runoff volume was 52,500 AF. The probable maximum snowmelt analysis showed Study Condition 3C to have the largest 60-day volume at 86,700 AF, but with a peak of only 1910 cfs. On the basis of event severity, and according to today's design guidelines, Study Condition 1A is controlling and referred to as the overall project design flood. Because of its derivation, Study Condition 1A would be referenced as a PMF.

A brief comparison will be made between the Phase 1 investigation results and the present findings. The COE Phase 1 investigation reported the following information: the 72-hour PMP was 17.6 inches, the PMP produced peak flow was 92,000 cfs, and the PMP produced runoff volume was 27,500 AF (U.S. Army Corps of Engineers, 1980). The COE results were based on procedures contained in U.S. Weather Bureau's Technical Paper 38, and on the SCS triangular unit hydrograph technique outlined in the USBR's Design of Small Dams. The present PMP/PMF study was based on new study techniques to be contained in HMR 55 and the two-parameter Clark Unitgraph. Specific to the HMR 55 results, the total 72-hour precipitation is much greater but the depth-duration curve is flatter along the rising limb of the curve. Another difference in 1980 COE techniques/results and the present analysis is the moisture loss assumptions. The present study was performed at a "design level" with more current guidelines, and hence, should be considered a refinement of earlier work.

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APPENDICES

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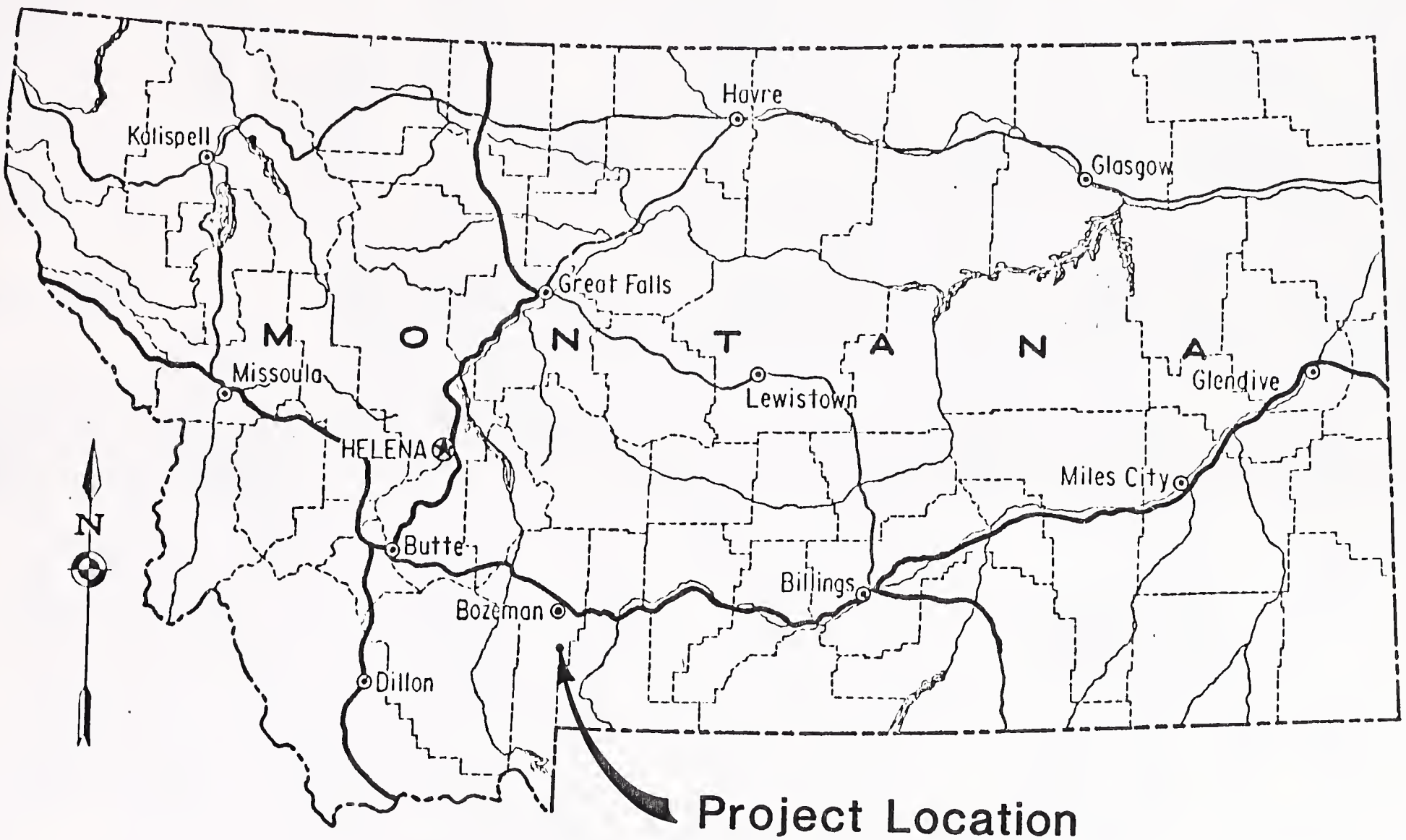
APPENDIX A - MISCELLANEOUS FIGURES AND TABLES

APPENDIX A - FIGURES



MIDDLE CREEK DAM

VICINITY MAP

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NOVEMBER 1983

FIGURE A1

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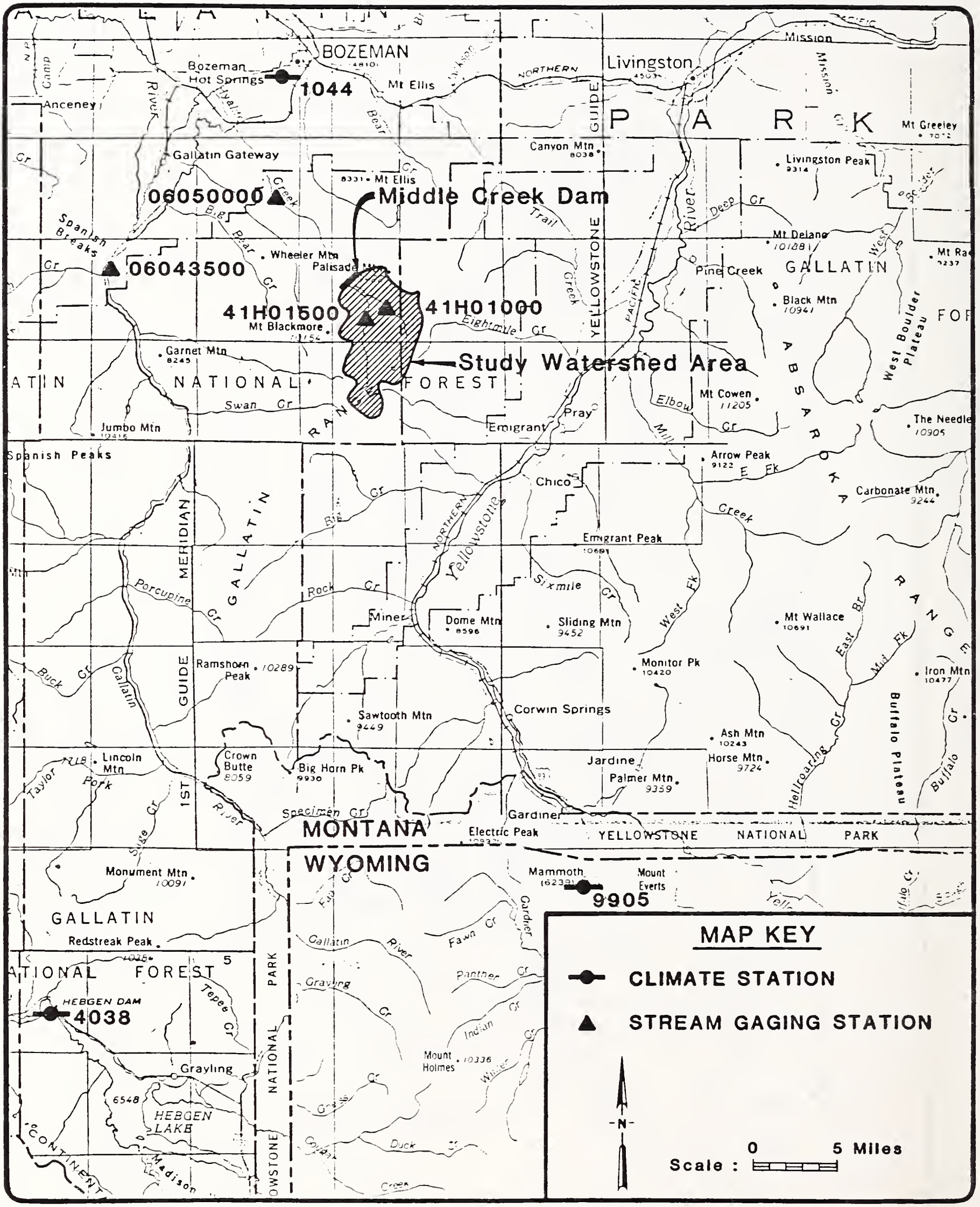

MIDDLE CREEK DAM

LOCATION MAP

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FIGURE A2

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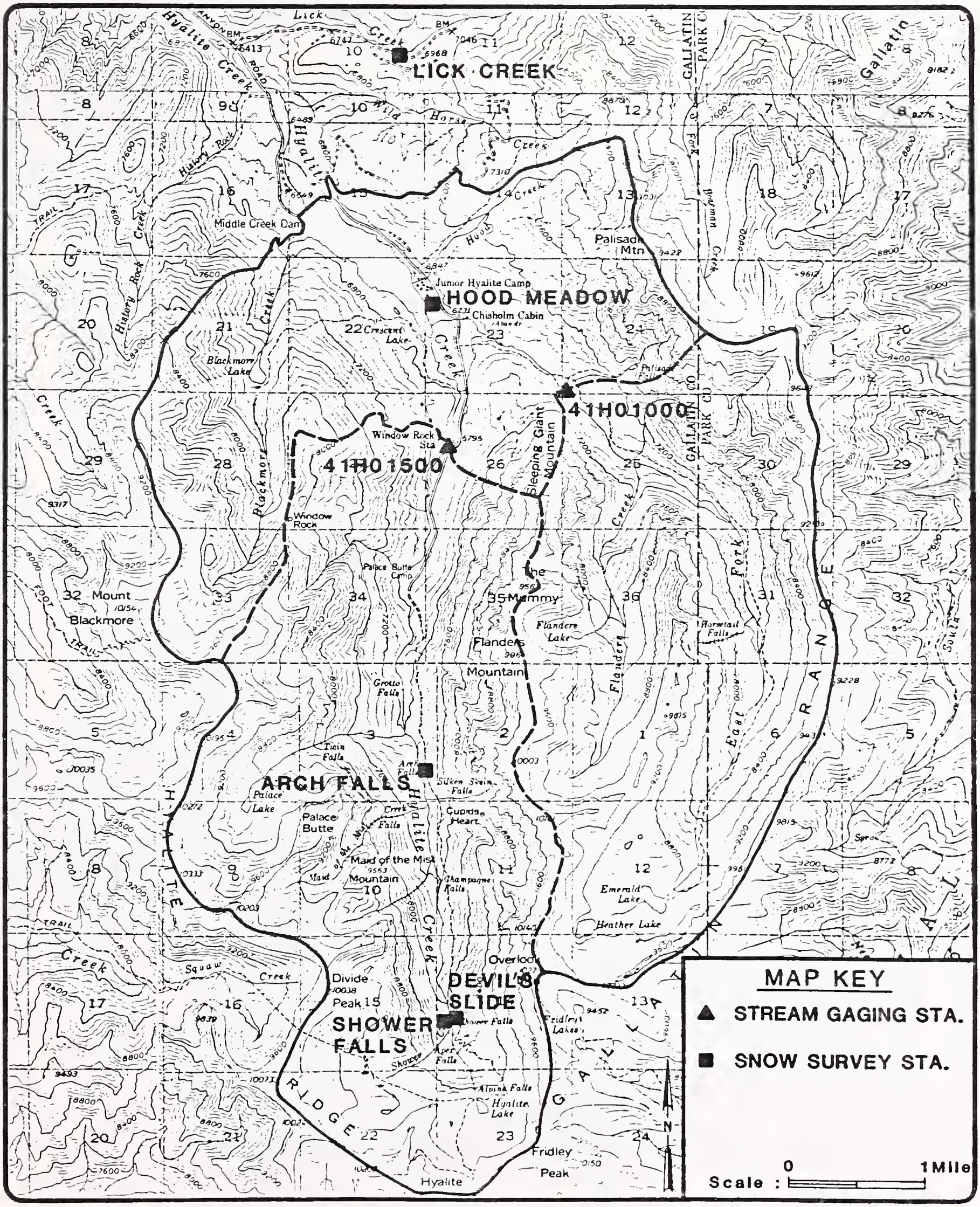

MIDDLE CREEK DAM

DRAINAGE AREA MAP

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FIGURE A3

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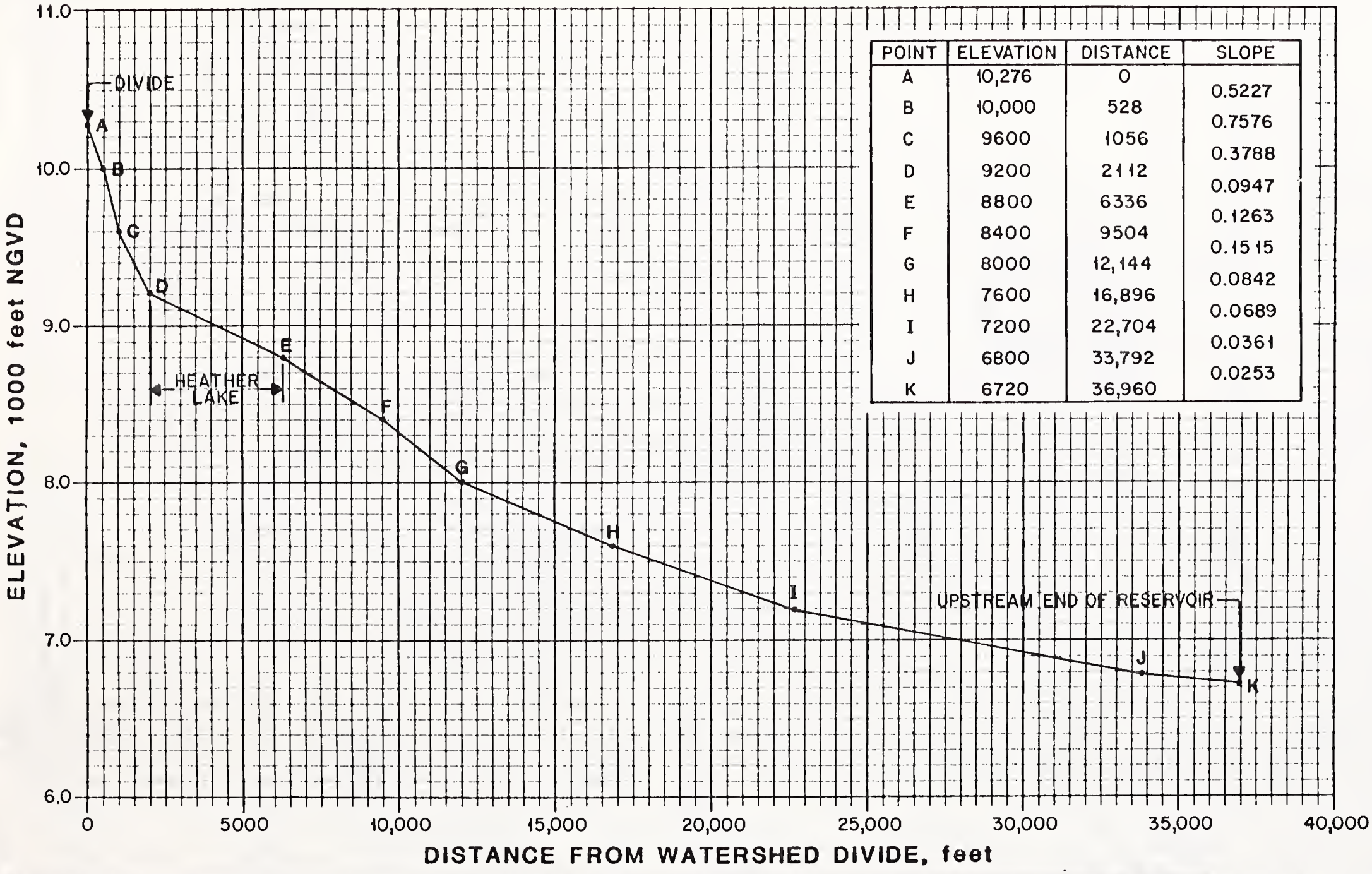

POINT	ELEVATION	DISTANCE	SLOPE
A	10,276	0	
			0.5227
B	10,000	528	
			0.7576
C	9600	1056	
			0.3788
D	9200	2112	
			0.0947
E	8800	6336	
			0.1263
F	8400	9504	
			0.1515
G	8000	12,144	
			0.0842
H	7600	16,896	
			0.0689
I	7200	22,704	
			0.0361
J	6800	33,792	
			0.0253
K	6720	36,960	

MIDDLE CREEK DAM

EAST FORK OF HYALITE CREEK STREAM PROFILE

8M087.113

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FIGURE A4

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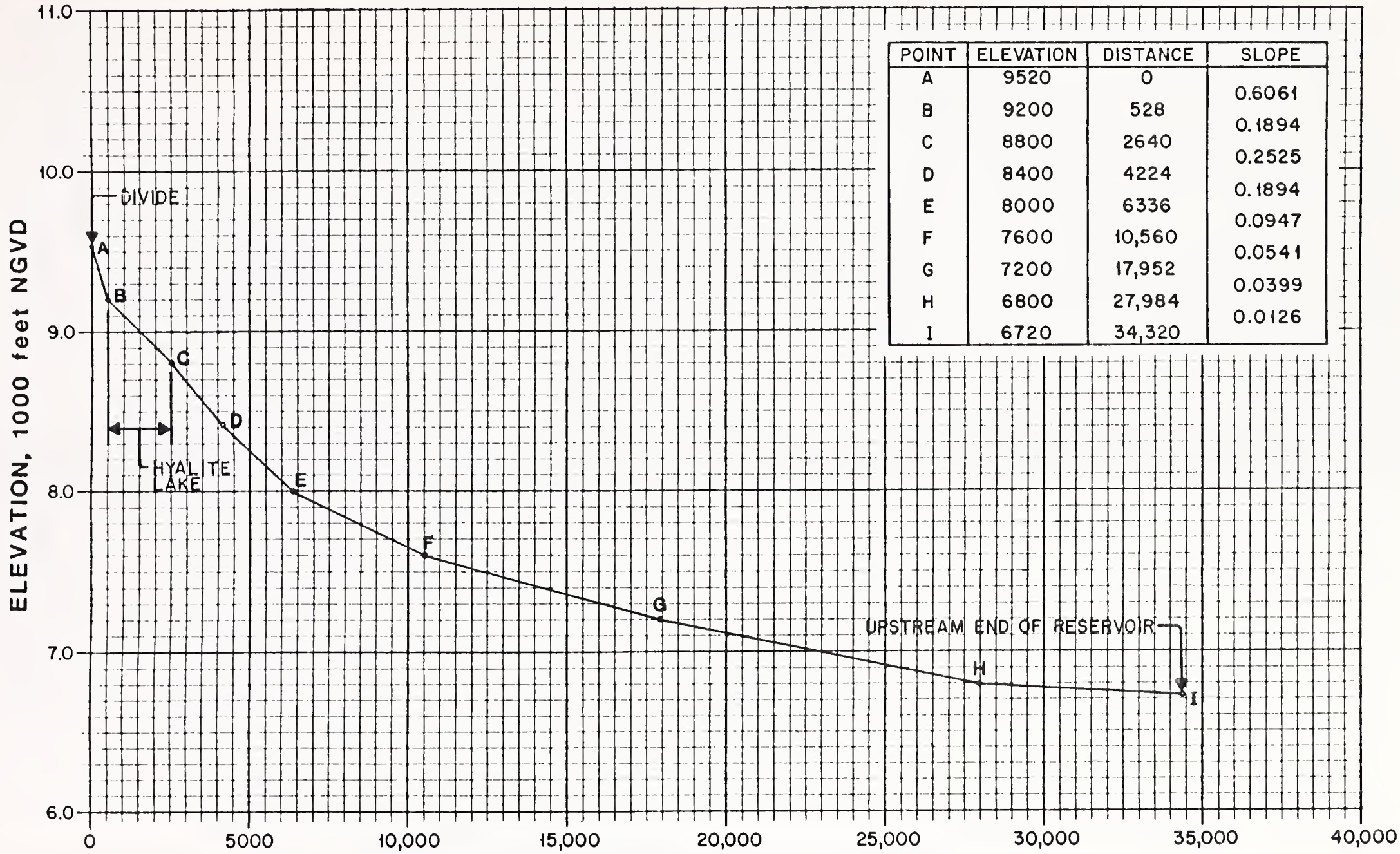

POINT	ELEVATION	DISTANCE	SLOPE
A	9520	0	
			0.6061
B	9200	528	
			0.1894
C	8800	2640	
			0.2525
D	8400	4224	
			0.1894
E	8000	6336	
			0.0947
F	7600	10,560	
			0.0541
G	7200	17,952	
			0.0399
H	6800	27,984	
			0.0126
I	6720	34,320	

MIDDLE CREEK DAM

WEST FORK OF HYALITE CREEK STREAM PROFILE

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NOVEMBER 1983

FIGURE A5

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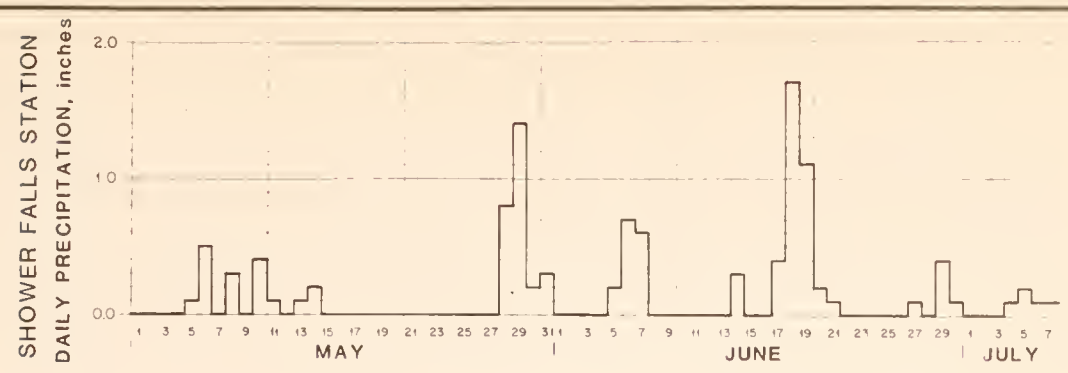

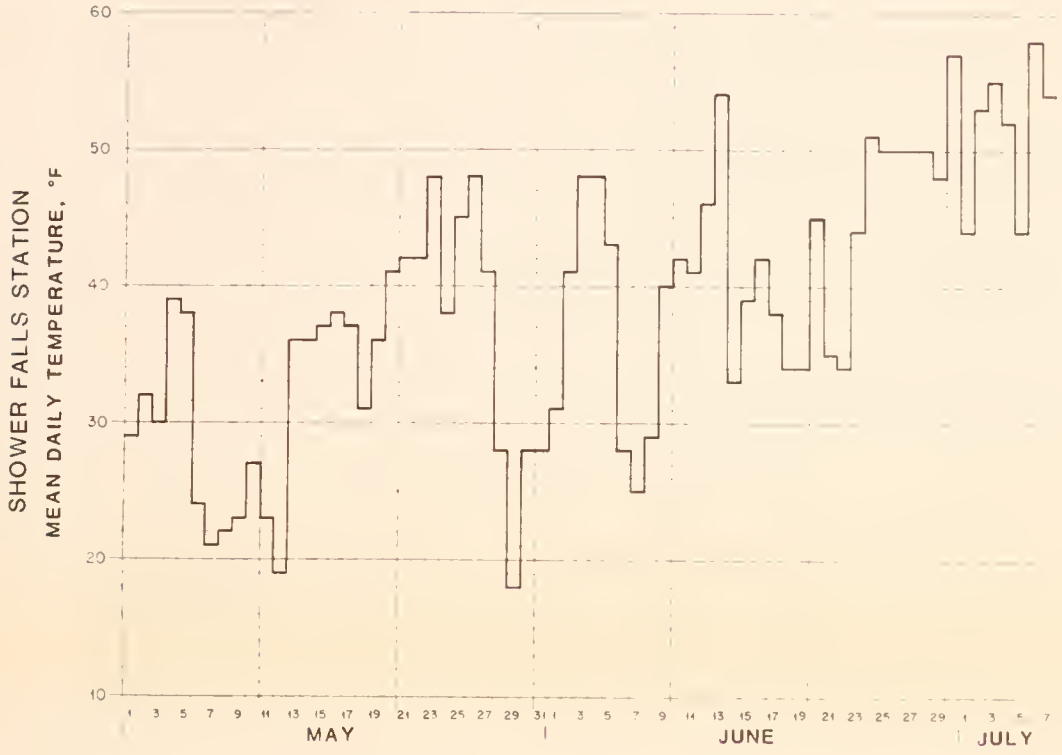

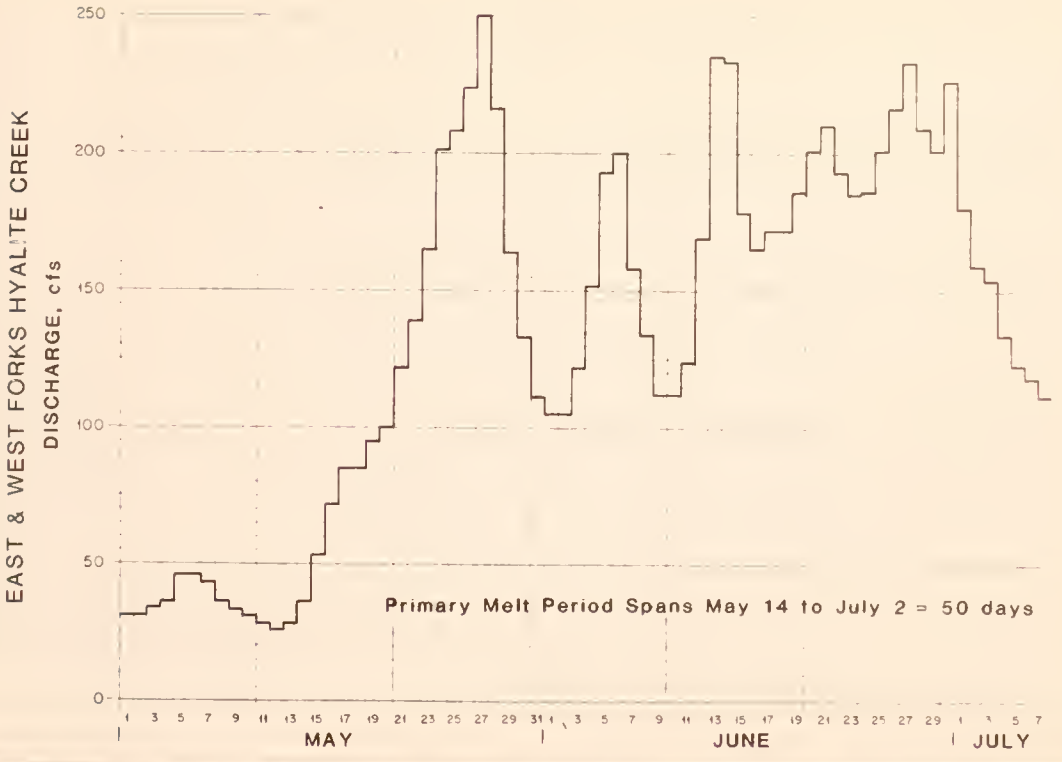

MIDDLE CREEK DAM

1979 CLIMATIC AND HYDROLOGIC DATA

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FIGURE A6

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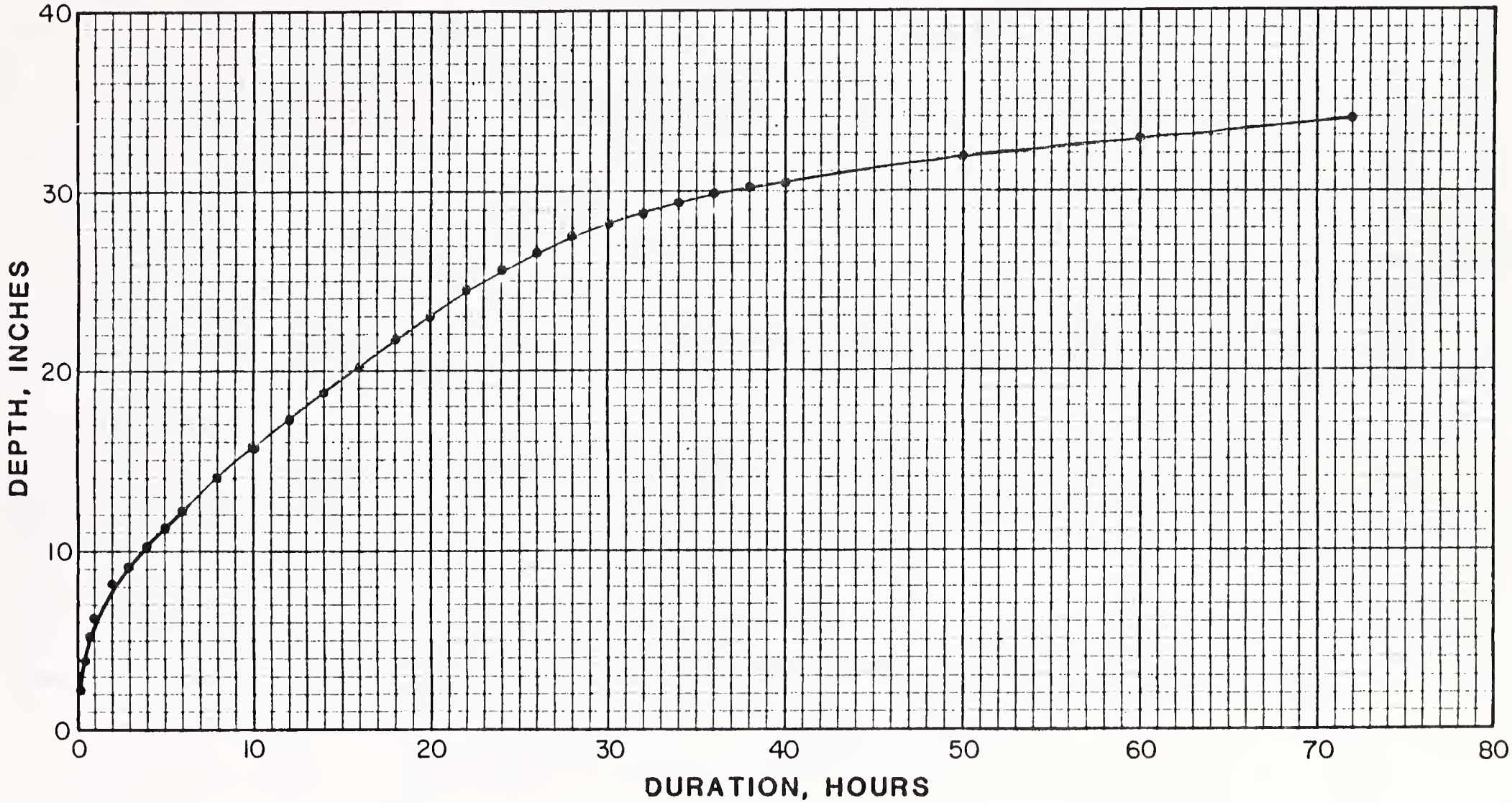

MIDDLE CREEK DAM

DEPTH DURATION CURVE: 72 HOUR PMP

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NOVEMBER 1983

FIGURE A7

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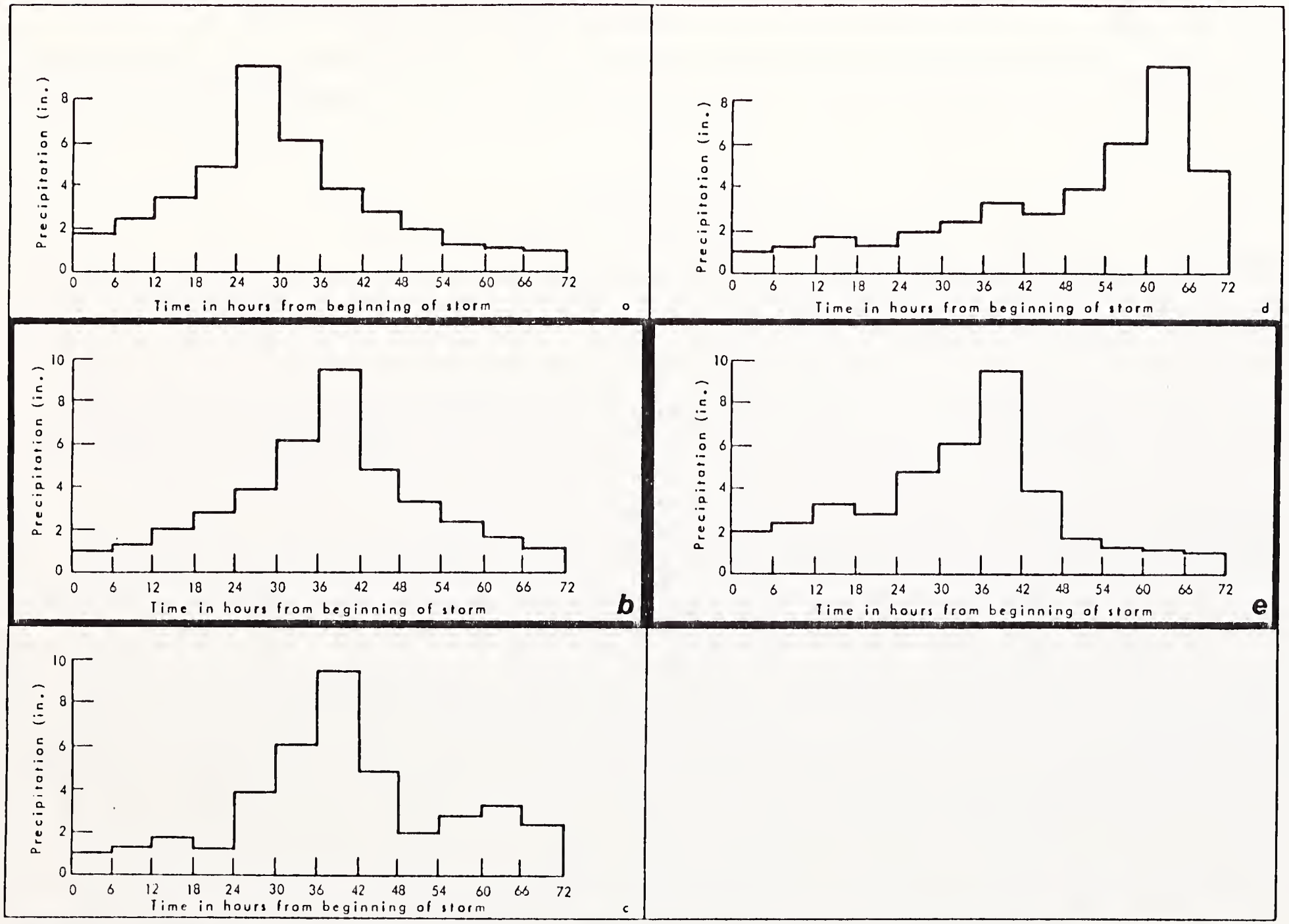

Source: Figure 6-1, Pg 204, HMR 43.

MIDDLE CREEK DAM

ALTERNATE DESIGN PRECIPITATION PATTERNS

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NOVEMBER 1983

FIGURE A8

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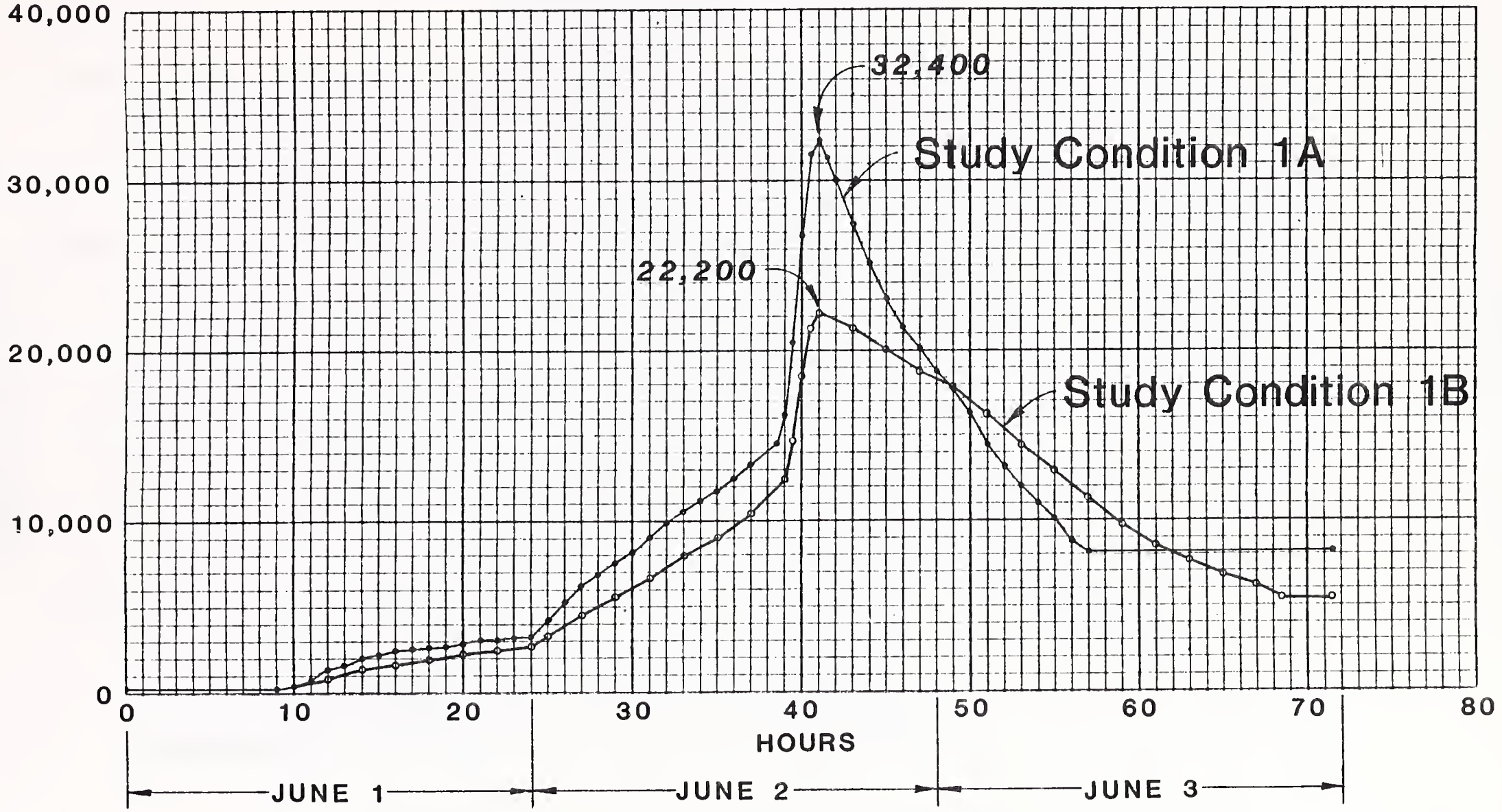

MIDDLE CREEK DAM

PROBABLE MAXIMUM FLOOD HYDROGRAPH

8M087.1130

APRIL 1984

FIGURE A 9

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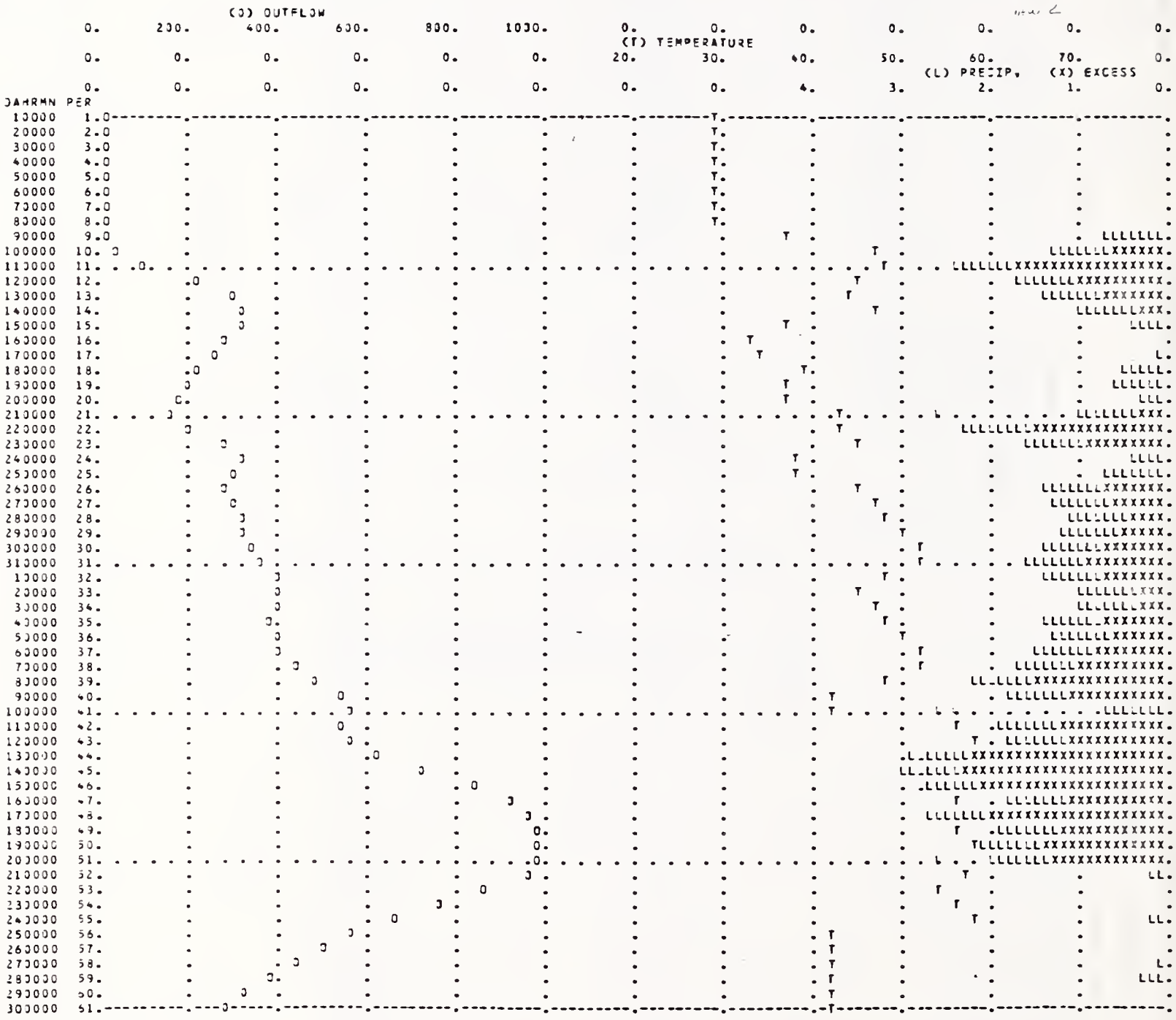
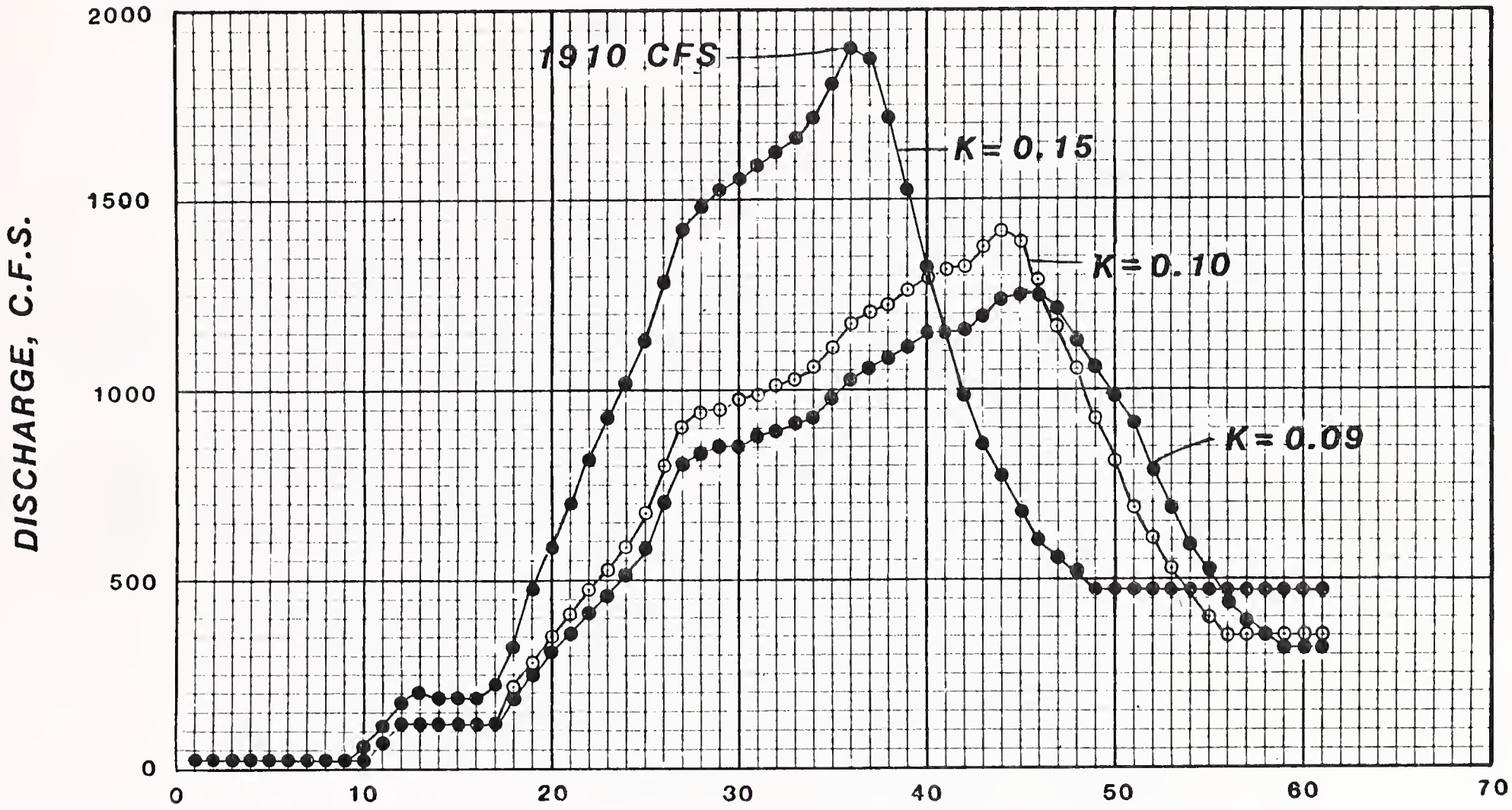
Figure A10
Study Condition 2



K = MELT FACTOR



MIDDLE CREEK DAM

PROBABLE MAXIMUM SNOWMELT HYDROGRAPHS

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NOVEMBER 1983

FIGURE A11

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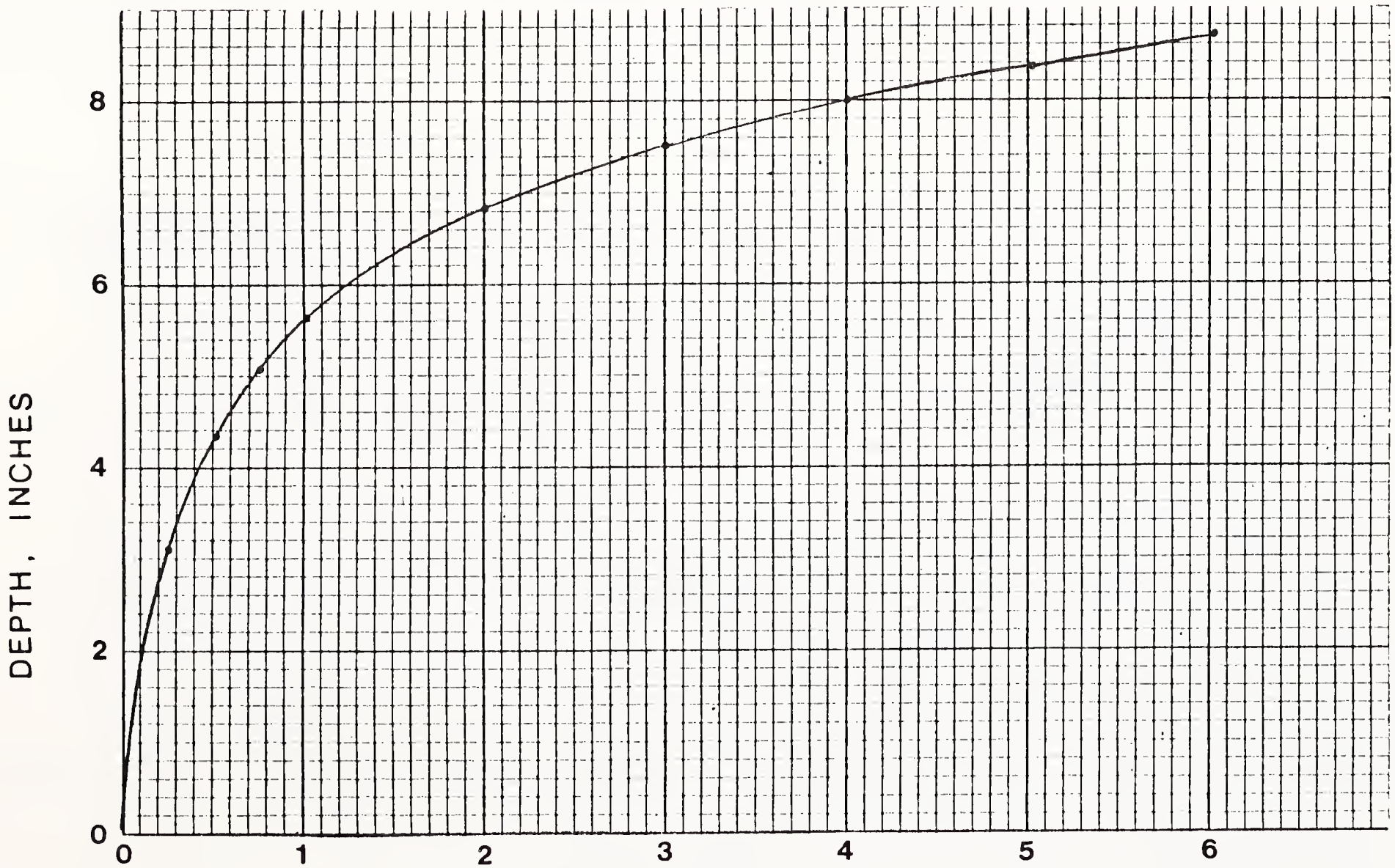

MIDDLE CREEK DAM

DEPTH-DURATION CURVE: 6 HOUR THUNDERSTORM PMP

8M087.1130

NOVEMBER 1983

FIGURE A12.

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Figure A13
Study Condition 4A

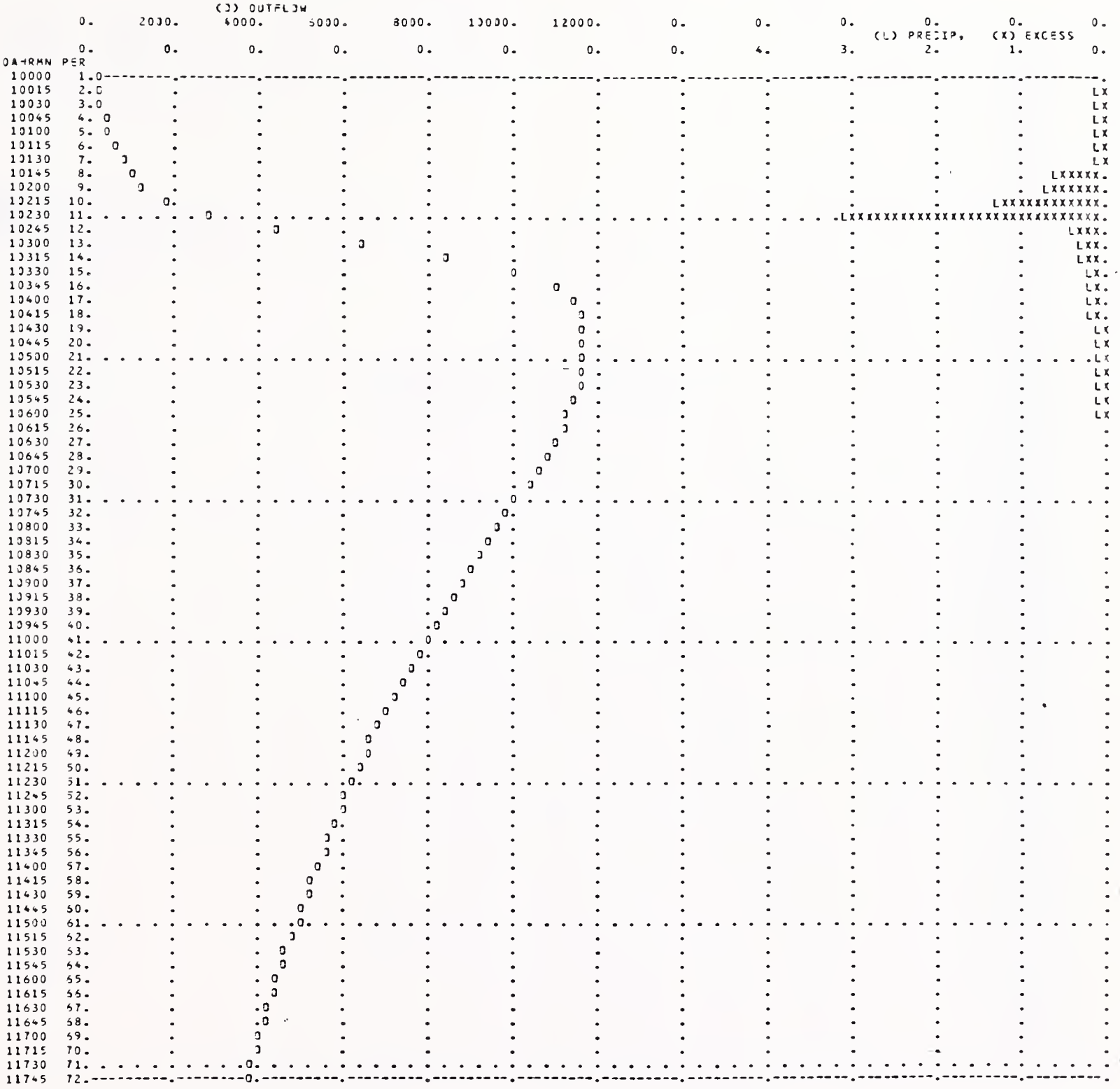
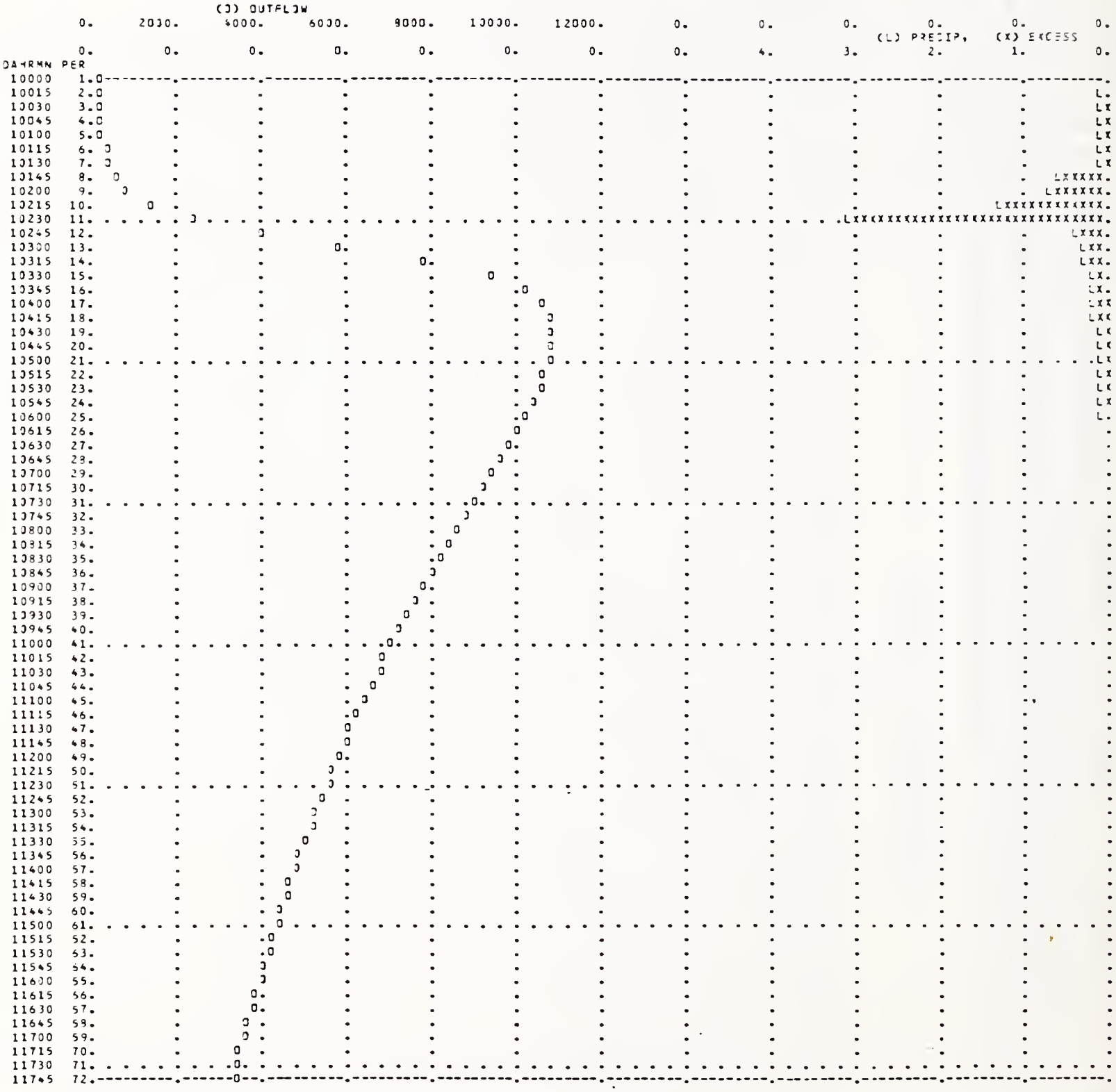


Figure A14
Study Condition 4B



APPENDIX A - TABLES

Table A1

Area-Altitude Summary
for
Middle Creek Dam Watershed

Elevation Zone, ft. NGVD	Incremental Area, sm	Accumulated Area, sm	Incremental Area as a Percent of the Total, percent
6700-7000	2.5	2.5	9
7000-8000	8.5	11.0	31
8000-9000	9.0	20.0	32
9000-10,000	7.0	27.0	27
10,000-10,300	1.0	27.0	1

Table A2

Drainage Area Summary

Description	Drainage Area, sm
East Fork Hyalite Creek above Gage (#41H01000)	8.4
West Fork Hyalite Creek above Gage (#41H01500)	11.0
Hyalite Creek above Middle Creek Dam	27.0
Hyalite Creek above Ranger Station (#06500000)	48.2

Table A3

Reconstitution Parameter Summary

	1979	1980 E.& W. Fork	1980 E. Fork	1980 W. Fork	1981	1982
CLARK UNITGRAPH PARAMETERS						
TC,hrs	24	26	25	26	25	53
R, hrs	225	367	298	381	223	175
Peak, cfs	51	31	17	17	50	58
TP, hrs	48	48	48	48	48	72
R/(TC+R)	0.90	0.93	0.92	0.94	0.90	0.77
LOSS RATES						
STRKR, in/hr	0.004	0.00	0.00	0.00	0.01	0.003
DLTKR, in	0.40	0.46	0.48	0.46	0.50	0.10
STRKS, in/hr	0.03	0.03	0.03	0.02	0.03	0.03
SUM OF COMPUTED Q, sfd	7747	7634	2625	4968	7170	9806
SUM OF ACTUAL OBSERVED Q, sfd	7747	7608	2638	4970	7174	9806
% DIFF VS COMPUTED	-0.01	0.35	-0.48	-0.04	-0.06	-0.00
COMPUTED PEAK Q, cfs	333	187	73	116	291	300
PEAK OBSERVED Q, cfs	250	221	75	154	249	323
% DIFF VS COMPUTED	33.34	-15.54	-2.37	-24.69	16.97	-7.22

Variable Definitions:

STRKR = Constant precipitation loss (precip. only).
DLTKR = Initial accumulated loss during which the loss coeff. is increased (precip. only).
STRKS = Constant snowmelt loss (controls during combined snowmelt and precip. periods).
TC = Time of concentration.
R = Storage coefficient relating to the surface runoff phenomenon.

8M087.1130/0560H

Table A4
Study Condition 1A

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JUN	0000	1	0.0	0.0	0.0	260.	2	JUN	1200	73	0.49	0.01	0.48	12523.
1	JUN	0030	2	0.0	0.0	0.0	260.	2	JUN	1230	74	0.50	0.01	0.49	12933.
1	JUN	0100	3	0.0	0.0	0.0	260.	2	JUN	1300	75	0.50	0.01	0.49	13333.
1	JUN	0130	4	0.0	0.0	0.0	260.	2	JUN	1330	76	0.51	0.01	0.50	13713.
1	JUN	0200	5	0.0	0.0	0.0	260.	2	JUN	1400	77	0.49	0.01	0.48	14062.
1	JUN	0230	6	0.0	0.0	0.0	260.	2	JUN	1430	78	0.92	0.01	0.91	14562.
1	JUN	0300	7	0.0	0.0	0.0	260.	2	JUN	1500	79	2.31	0.01	2.30	16142.
1	JUN	0330	8	0.0	0.0	0.0	260.	2	JUN	1530	80	3.95	0.01	3.94	20501.
1	JUN	0400	9	0.0	0.0	0.0	260.	2	JUN	1600	81	0.94	0.01	0.93	26939.
1	JUN	0430	10	0.0	0.0	0.0	260.	2	JUN	1630	82	0.58	0.01	0.57	31575.
1	JUN	0500	11	0.0	0.0	0.0	260.	2	JUN	1700	83	0.52	0.01	0.51	32613.
1	JUN	0530	12	0.0	0.0	0.0	260.	2	JUN	1730	84	0.51	0.01	0.50	31299.
1	JUN	0600	13	0.0	0.0	0.0	260.	2	JUN	1800	85	0.50	0.01	0.49	30043.
1	JUN	0630	14	0.0	0.0	0.0	260.	2	JUN	1830	86	0.40	0.01	0.39	28805.
1	JUN	0700	15	0.0	0.0	0.0	260.	2	JUN	1900	87	0.40	0.01	0.39	27550.
1	JUN	0730	16	0.0	0.0	0.0	260.	2	JUN	1930	88	0.40	0.01	0.39	26289.
1	JUN	0800	17	0.0	0.0	0.0	260.	2	JUN	2000	89	0.40	0.01	0.39	25103.
1	JUN	0830	18	0.0	0.0	0.0	260.	2	JUN	2030	90	0.40	0.01	0.39	24030.
1	JUN	0900	19	0.0	0.0	0.0	260.	2	JUN	2100	91	0.40	0.01	0.39	23059.
1	JUN	0930	20	0.10	0.02	0.08	296.	2	JUN	2130	92	0.40	0.01	0.39	22188.
1	JUN	1000	21	0.10	0.02	0.08	427.	2	JUN	2200	93	0.40	0.01	0.39	21386.
1	JUN	1030	22	0.10	0.01	0.09	648.	2	JUN	2230	94	0.40	0.01	0.39	20667.
1	JUN	1100	23	0.10	0.01	0.09	891.	2	JUN	2300	95	0.40	0.01	0.39	20016.
1	JUN	1130	24	0.10	0.01	0.09	1118.	2	JUN	2330	96	0.40	0.01	0.39	19427.
1	JUN	1200	25	0.10	0.01	0.09	1329.	3	JUN	0000	97	0.40	0.01	0.39	18895.
1	JUN	1230	26	0.10	0.01	0.09	1522.	3	JUN	0030	98	0.30	0.01	0.29	18363.
1	JUN	1300	27	0.10	0.01	0.09	1699.	3	JUN	0100	99	0.28	0.01	0.27	17761.
1	JUN	1330	28	0.10	0.01	0.09	1860.	3	JUN	0130	100	0.20	0.01	0.19	17031.
1	JUN	1400	29	0.10	0.01	0.09	2006.	3	JUN	0200	101	0.20	0.01	0.19	16205.
1	JUN	1430	30	0.10	0.01	0.09	2138.	3	JUN	0230	102	0.20	0.01	0.19	15352.
1	JUN	1500	31	0.10	0.01	0.09	2258.	3	JUN	0300	103	0.20	0.01	0.19	14542.
1	JUN	1530	32	0.10	0.01	0.09	2367.	3	JUN	0330	104	0.20	0.01	0.19	13809.
1	JUN	1600	33	0.10	0.01	0.09	2465.	3	JUN	0400	105	0.20	0.01	0.19	13145.
1	JUN	1630	34	0.10	0.01	0.09	2553.	3	JUN	0430	106	0.20	0.01	0.19	12546.
1	JUN	1700	35	0.10	0.01	0.09	2634.	3	JUN	0500	107	0.20	0.01	0.19	12000.
1	JUN	1730	36	0.10	0.01	0.09	2706.	3	JUN	0530	108	0.20	0.01	0.19	11503.
1	JUN	1800	37	0.10	0.01	0.09	2772.	3	JUN	0600	109	0.20	0.01	0.19	11063.
1	JUN	1830	38	0.10	0.01	0.09	2831.	3	JUN	0630	110	0.10	0.01	0.09	10515.
1	JUN	1900	39	0.10	0.01	0.09	2885.	3	JUN	0700	111	0.10	0.01	0.09	10089.
1	JUN	1930	40	0.10	0.01	0.09	2934.	3	JUN	0730	112	0.10	0.01	0.09	9692.
1	JUN	2000	41	0.10	0.01	0.09	2978.	3	JUN	0800	113	0.10	0.01	0.09	8907.
1	JUN	2030	42	0.10	0.01	0.09	3018.	3	JUN	0830	114	0.10	0.01	0.09	8377.
1	JUN	2100	43	0.10	0.01	0.09	3054.	3	JUN	0900	115	0.10	0.01	0.09	8103.
1	JUN	2130	44	0.10	0.01	0.09	3086.	3	JUN	0930	116	0.10	0.01	0.09	8103.
1	JUN	2200	45	0.10	0.01	0.09	3116.	3	JUN	1000	117	0.10	0.01	0.09	8103.
1	JUN	2230	46	0.10	0.01	0.09	3143.	3	JUN	1030	118	0.10	0.01	0.09	8103.
1	JUN	2300	47	0.10	0.01	0.09	3167.	3	JUN	1100	119	0.10	0.01	0.09	8103.
1	JUN	2330	48	0.20	0.01	0.19	3236.	3	JUN	1130	120	0.10	0.01	0.09	8103.
2	JUN	0000	49	0.20	0.01	0.19	3415.	3	JUN	1200	121	0.10	0.01	0.09	8103.
2	JUN	0030	50	0.30	0.01	0.29	3745.	3	JUN	1230	122	0.10	0.01	0.09	8103.
2	JUN	0100	51	0.30	0.01	0.29	4210.	3	JUN	1300	123	0.10	0.01	0.09	8103.
2	JUN	0130	52	0.30	0.01	0.29	4751.	3	JUN	1330	124	0.10	0.01	0.09	8103.
2	JUN	0200	53	0.30	0.01	0.29	5286.	3	JUN	1400	125	0.10	0.01	0.09	8103.
2	JUN	0230	54	0.30	0.01	0.29	5770.	3	JUN	1430	126	0.10	0.01	0.09	8103.
2	JUN	0300	55	0.30	0.01	0.29	6207.	3	JUN	1500	127	0.10	0.01	0.09	8103.
2	JUN	0330	56	0.30	0.01	0.29	6603.	3	JUN	1530	128	0.10	0.01	0.09	8103.
2	JUN	0400	57	0.30	0.01	0.29	6962.	3	JUN	1600	129	0.10	0.01	0.09	8103.
2	JUN	0430	58	0.30	0.01	0.29	7286.	3	JUN	1630	130	0.10	0.01	0.09	8103.
2	JUN	0500	59	0.30	0.01	0.29	7579.	3	JUN	1700	131	0.10	0.01	0.09	8103.
2	JUN	0530	60	0.32	0.01	0.31	7856.	3	JUN	1730	132	0.10	0.01	0.09	8103.
2	JUN	0600	61	0.40	0.01	0.39	8162.	3	JUN	1800	133	0.10	0.01	0.09	8103.
2	JUN	0630	62	0.40	0.01	0.39	8562.	3	JUN	1830	134	0.0	0.0	0.0	8103.
2	JUN	0700	63	0.40	0.01	0.39	9033.	3	JUN	1900	135	0.0	0.0	0.0	8103.
2	JUN	0730	64	0.40	0.01	0.39	9489.	3	JUN	1930	136	0.0	0.0	0.0	8103.
2	JUN	0800	65	0.40	0.01	0.39	9906.	3	JUN	2000	137	0.0	0.0	0.0	8103.
2	JUN	0830	66	0.40	0.01	0.39	10283.	3	JUN	2030	138	0.0	0.0	0.0	8103.
2	JUN	0900	67	0.40	0.01	0.39	10623.	3	JUN	2100	139	0.0	0.0	0.0	8103.
2	JUN	0930	68	0.40	0.01	0.39	10928.	3	JUN	2130	140	0.0	0.0	0.0	8103.
2	JUN	1000	69	0.40	0.01	0.39	11206.	3	JUN	2200	141	0.0	0.0	0.0	8103.
2	JUN	1030	70	0.42	0.01	0.41	11467.	3	JUN	2230	142	0.0	0.0	0.0	8103.
2	JUN	1100	71	0.48	0.01	0.47	11756.	3	JUN	2300	143	0.0	0.0	0.0	8103.
2	JUN	1130	72	0.48	0.01	0.47	12111.	3	JUN	2330	144	0.0	0.0	0.0	8103.

TOTAL RAINFALL = 34.00, TOTAL LOSS = 1.17, TOTAL EXCESS = 32.83

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	71.58-HR
32413.	41.00	(CFS)	27370.	17494.	8884.	8884.
		(INCHES)	9.425	24.082	36.455	36.455
		(AC-FT)	13572.	34678.	52496.	52496.

CUMULATIVE AREA = 27.00 SQ MI

Table A5

Study Condition 1B

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JUN	0000	1	0.0	0.0	0.0	260.	2	JUN	1200	73	0.49	0.01	0.48	9753.
1	JUN	0030	2	0.0	0.0	0.0	260.	2	JUN	1230	74	0.50	0.01	0.49	10099.
1	JUN	0100	3	0.0	0.0	0.0	260.	2	JUN	1300	75	0.50	0.01	0.49	10441.
1	JUN	0130	4	0.0	0.0	0.0	260.	2	JUN	1330	76	0.51	0.01	0.50	10778.
1	JUN	0200	5	0.0	0.0	0.0	260.	2	JUN	1400	77	0.49	0.01	0.48	11101.
1	JUN	0230	6	0.0	0.0	0.0	260.	2	JUN	1430	78	0.92	0.01	0.91	11503.
1	JUN	0300	7	0.0	0.0	0.0	260.	2	JUN	1500	79	2.31	0.01	2.30	12462.
1	JUN	0330	8	0.0	0.0	0.0	260.	2	JUN	1530	80	3.95	0.01	3.94	14375.
1	JUN	0400	9	0.0	0.0	0.0	260.	2	JUN	1600	81	0.94	0.01	0.93	18443.
1	JUN	0430	10	0.0	0.0	0.0	260.	2	JUN	1630	82	0.58	0.01	0.57	21237.
1	JUN	0500	11	0.0	0.0	0.0	260.	2	JUN	1700	83	0.52	0.01	0.51	22171.
1	JUN	0530	12	0.0	0.0	0.0	260.	2	JUN	1730	84	0.51	0.01	0.50	22101.
1	JUN	0600	13	0.0	0.0	0.0	260.	2	JUN	1800	85	0.50	0.01	0.49	21906.
1	JUN	0630	14	0.0	0.0	0.0	260.	2	JUN	1830	86	0.40	0.01	0.39	21671.
1	JUN	0700	15	0.0	0.0	0.0	260.	2	JUN	1900	87	0.40	0.01	0.39	21376.
1	JUN	0730	16	0.0	0.0	0.0	260.	2	JUN	1930	88	0.40	0.01	0.39	21032.
1	JUN	0800	17	0.0	0.0	0.0	260.	2	JUN	2000	89	0.40	0.01	0.39	20682.
1	JUN	0830	18	0.0	0.0	0.0	260.	2	JUN	2030	90	0.40	0.01	0.39	20349.
1	JUN	0900	19	0.0	0.0	0.0	260.	2	JUN	2100	91	0.40	0.01	0.39	20032.
1	JUN	0930	20	0.10	0.02	0.08	279.	2	JUN	2130	92	0.40	0.01	0.39	19730.
1	JUN	1000	21	0.10	0.02	0.08	346.	2	JUN	2200	93	0.40	0.01	0.39	19443.
1	JUN	1030	22	0.10	0.01	0.09	463.	2	JUN	2230	94	0.40	0.01	0.39	19171.
1	JUN	1100	23	0.10	0.01	0.09	597.	2	JUN	2300	95	0.40	0.01	0.39	18911.
1	JUN	1130	24	0.10	0.01	0.09	729.	2	JUN	2330	96	0.40	0.01	0.39	18664.
1	JUN	1200	25	0.10	0.01	0.09	354.	3	JUN	0000	97	0.40	0.01	0.39	18429.
1	JUN	1230	26	0.10	0.01	0.09	977.	3	JUN	0030	98	0.30	0.01	0.29	18133.
1	JUN	1300	27	0.10	0.01	0.09	1094.	3	JUN	0100	99	0.23	0.01	0.27	17382.
1	JUN	1330	28	0.10	0.01	0.09	1206.	3	JUN	0130	100	0.20	0.01	0.19	17503.
1	JUN	1400	29	0.10	0.01	0.09	1313.	3	JUN	0200	101	0.20	0.01	0.19	17057.
1	JUN	1430	30	0.10	0.01	0.09	1414.	3	JUN	0230	102	0.20	0.01	0.19	16580.
1	JUN	1500	31	0.10	0.01	0.09	1511.	3	JUN	0300	103	0.20	0.01	0.19	16106.
1	JUN	1530	32	0.10	0.01	0.09	1603.	3	JUN	0330	104	0.20	0.01	0.19	15656.
1	JUN	1600	33	0.10	0.01	0.09	1690.	3	JUN	0400	105	0.20	0.01	0.19	15223.
1	JUN	1630	34	0.10	0.01	0.09	1774.	3	JUN	0430	106	0.20	0.01	0.19	14821.
1	JUN	1700	35	0.10	0.01	0.09	1853.	3	JUN	0500	107	0.20	0.01	0.19	14434.
1	JUN	1730	36	0.10	0.01	0.09	1928.	3	JUN	0530	108	0.20	0.01	0.19	14065.
1	JUN	1800	37	0.10	0.01	0.09	2000.	3	JUN	0600	109	0.20	0.01	0.19	13715.
1	JUN	1830	38	0.10	0.01	0.09	2068.	3	JUN	0630	110	0.10	0.01	0.09	13358.
1	JUN	1900	39	0.10	0.01	0.09	2133.	3	JUN	0700	111	0.10	0.01	0.09	12957.
1	JUN	1930	40	0.10	0.01	0.09	2194.	3	JUN	0730	112	0.10	0.01	0.09	12514.
1	JUN	2000	41	0.10	0.01	0.09	2253.	3	JUN	0800	113	0.10	0.01	0.09	12063.
1	JUN	2030	42	0.10	0.01	0.09	2309.	3	JUN	0830	114	0.10	0.01	0.09	11646.
1	JUN	2100	43	0.10	0.01	0.09	2362.	3	JUN	0900	115	0.10	0.01	0.09	11244.
1	JUN	2130	44	0.10	0.01	0.09	2412.	3	JUN	0930	116	0.10	0.01	0.09	10861.
1	JUN	2200	45	0.10	0.01	0.09	2460.	3	JUN	1000	117	0.10	0.01	0.09	10497.
1	JUN	2230	46	0.10	0.01	0.09	2506.	3	JUN	1030	118	0.10	0.01	0.09	10150.
1	JUN	2300	47	0.10	0.01	0.09	2549.	3	JUN	1100	119	0.10	0.01	0.09	9821.
1	JUN	2330	48	0.20	0.01	0.19	2614.	3	JUN	1130	120	0.10	0.01	0.09	9508.
2	JUN	0000	49	0.20	0.01	0.19	2737.	3	JUN	1200	121	0.10	0.01	0.09	9209.
2	JUN	0030	50	0.30	0.01	0.29	2939.	3	JUN	1230	122	0.10	0.01	0.09	8926.
2	JUN	0100	51	0.30	0.01	0.29	3216.	3	JUN	1300	123	0.10	0.01	0.09	8656.
2	JUN	0130	52	0.30	0.01	0.29	3542.	3	JUN	1330	124	0.10	0.01	0.09	8397.
2	JUN	0200	53	0.30	0.01	0.29	3875.	3	JUN	1400	125	0.10	0.01	0.09	8155.
2	JUN	0230	54	0.30	0.01	0.29	4191.	3	JUN	1430	126	0.10	0.01	0.09	7923.
2	JUN	0300	55	0.30	0.01	0.29	4493.	3	JUN	1500	127	0.10	0.01	0.09	7702.
2	JUN	0330	56	0.30	0.01	0.29	4779.	3	JUN	1530	128	0.10	0.01	0.09	7492.
2	JUN	0400	57	0.30	0.01	0.29	5052.	3	JUN	1600	129	0.10	0.01	0.09	7291.
2	JUN	0430	58	0.30	0.01	0.29	5311.	3	JUN	1630	130	0.10	0.01	0.09	7100.
2	JUN	0500	59	0.30	0.01	0.29	5557.	3	JUN	1700	131	0.10	0.01	0.09	6919.
2	JUN	0530	60	0.32	0.01	0.31	5797.	3	JUN	1730	132	0.10	0.01	0.09	6746.
2	JUN	0600	61	0.40	0.01	0.39	6055.	3	JUN	1800	133	0.10	0.01	0.09	6582.
2	JUN	0630	62	0.40	0.01	0.39	6363.	3	JUN	1830	134	0.0	0.0	0.0	6405.
2	JUN	0700	63	0.40	0.01	0.39	6709.	3	JUN	1900	135	0.0	0.0	0.0	6181.
2	JUN	0730	64	0.40	0.01	0.39	7058.	3	JUN	1930	136	0.0	0.0	0.0	5912.
2	JUN	0800	65	0.40	0.01	0.39	7389.	3	JUN	2000	137	0.0	0.0	0.0	5636.
2	JUN	0830	66	0.40	0.01	0.39	7704.	3	JUN	2030	138	0.0	0.0	0.0	5543.
2	JUN	0900	67	0.40	0.01	0.39	8004.	3	JUN	2100	139	0.0	0.0	0.0	5543.
2	JUN	0930	68	0.40	0.01	0.39	8289.	3	JUN	2130	140	0.0	0.0	0.0	5543.
2	JUN	1000	69	0.40	0.01	0.39	8561.	3	JUN	2200	141	0.0	0.0	0.0	5543.
2	JUN	1030	70	0.42	0.01	0.41	8823.	3	JUN	2230	142	0.0	0.0	0.0	5543.
2	JUN	1100	71	0.48	0.01	0.47	9099.	3	JUN	2300	143	0.0	0.0	0.0	5543.
2	JUN	1130	72	0.48	0.01	0.47	9412.	3	JUN	2330	144	0.0	0.0	0.0	5543.

TOTAL RAINFALL = 34.00, TOTAL LOSS = 1.17, TOTAL EXCESS = 32.83

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	71.50-HR
22171.	41.00	(CFS)	20936.	15670.	7767.	7767.
		(INCHES)	7.209	21.584	31.874	31.874
		(AC-FT)	10381.	31082.	45898.	45898.

CUMULATIVE AREA = 27.00 SQ MI

Table A6

Time of Concentration Calculations

TIME OF CONCENTRATION

Flow Course	Travel Distance In Ft.	Average Velocity In FPS	Time In Hrs.
Channel	34,848	7	1.38
Overland	2,112	3	0.20
		TOTAL	1.58
			(Use 1.5 Hr.)

8M087.1130/0639H

Table A7

Design Flood Parameter Summary

	Study Condition #1		Study Condition #2	Study Condition #3			Study Condition #4	
	1A	1B		3A	3B	3C	4A	4B
CLARK UNITGRAPH PARAMETERS								
TC, hrs	1.5	1.5	50	50	50	50	1.5	1.5
R, hrs	5	10	165	165	165	165	10	10
Peak, cfs	2870	1580	85	85	85	85	1600	1600
TP, hrs	2	2	72	72	72	72	1.75	1.75
LOSS RATES								
STRKR, in/hr	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.15
DLTKR, in	0.1	0.1	0.5	0.5	0.5	0.5	0.1	0.1
STRKS, in/hr	--	--	0.03	0.03	0.03	0.03	--	--
PEAK, cfs	32,400	22,200	989	1260	1410	1910	11,700	10,800
cfs/sm	1,200	820	37	47	52	71	430	400
6-HR VOL,af	--	--	--	--	--	--	5220	4760
72-HR VOL, af	52,500	45,900	--	--	--	--	--	--
60-DAY VOL, af	--	--	47,400	69,900	73,900	86,700	--	--
BASE FLOW, cfs	260	260	25	25	25	25	260	135
MELT COEF., K	--	--	0.07	0.09	0.10	0.15	--	--

Variable Definitions:

STRKR = Constant precipitation loss (precip. only).
DLTKR = Initial accumulated loss during which the loss coeff. is increased (precip. only).
STRKS = Constant snowmelt loss (controls during combined snowmelt and precip. periods).
TC = Time of concentration.
R = Storage coefficient relating to the surface runoff phenomenon.

Table A8
Study Condition 2

DA	MON	HRMN	ORD	PRECIP	TEMP	SNOMELT	SNOLOSS	SNOEXCS	RAIN	RAINLOS	RAINEXS	SNO+RAIN	LOSS	EXCESS	COMP Q
1	MAY	0000	1	0.00	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	25.
2	MAY	0000	2	0.00	28.9	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.00	25.
3	MAY	0000	3	0.20	28.9	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	25.
4	MAY	0000	4	0.30	28.9	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	25.
5	MAY	0000	5	0.30	28.9	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	25.
6	MAY	0000	6	0.50	28.9	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.00	25.
7	MAY	0000	7	0.50	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	25.
8	MAY	0000	8	0.20	28.9	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	25.
9	MAY	0000	9	0.30	37.2	0.36	0.36	0.00	0.30	0.30	0.00	0.65	0.56	0.00	25.
10	MAY	0000	10	0.30	46.5	1.01	0.56	0.46	0.30	0.16	0.14	1.31	0.72	0.59	39.
11	MAY	0000	11	1.30	47.5	1.08	0.33	0.76	1.30	0.39	0.91	2.33	0.72	1.56	104.
12	MAY	0000	12	0.80	44.5	0.87	0.38	0.50	0.90	0.36	0.46	1.67	0.72	0.35	212.
13	MAY	0000	13	0.60	44.0	0.84	0.42	0.42	0.60	0.30	0.30	1.44	0.72	0.72	294.
14	MAY	0000	14	0.00	46.5	1.01	0.72	0.29	0.00	0.0	0.00	1.01	0.72	0.29	325.
15	MAY	0000	15	0.10	36.5	0.31	0.31	0.00	0.10	0.10	0.00	0.41	0.41	0.00	318.
16	MAY	0000	16	0.20	32.5	0.03	0.03	0.00	0.00	0.0	0.00	0.03	0.03	0.00	286.
17	MAY	0000	17	0.30	33.5	0.10	0.10	0.00	0.00	0.0	0.00	0.10	0.10	0.00	251.
18	MAY	0000	18	0.00	38.5	0.45	0.45	0.00	0.0	0.0	0.00	0.45	0.45	0.00	220.
19	MAY	0000	19	0.30	36.5	0.31	0.31	0.00	0.30	0.30	0.00	0.61	0.51	0.00	194.
20	MAY	0000	20	0.00	36.5	0.31	0.31	0.00	0.00	0.0	0.00	0.31	0.31	0.00	171.
21	MAY	0000	21	0.30	42.5	0.73	0.51	0.22	0.30	0.21	0.09	1.03	0.72	0.31	159.
22	MAY	0000	22	1.50	43.0	0.77	0.24	0.53	1.50	0.48	1.02	2.27	0.72	1.55	192.
23	MAY	0000	23	0.70	45.0	0.91	0.41	0.50	0.70	0.31	0.39	1.61	0.72	0.89	273.
24	MAY	0000	24	0.00	37.5	0.38	0.38	0.00	0.00	0.0	0.00	0.38	0.38	0.00	324.
25	MAY	0000	25	0.30	37.5	0.38	0.38	0.00	0.30	0.30	0.00	0.68	0.58	0.00	307.
26	MAY	0000	26	0.50	45.0	0.91	0.46	0.45	0.50	0.26	0.24	1.41	0.72	0.69	285.
27	MAY	0000	27	0.30	47.0	1.05	0.56	0.49	0.30	0.16	0.14	1.35	0.72	0.63	298.
28	MAY	0000	28	0.00	47.5	1.08	0.72	0.36	0.00	0.0	0.00	1.08	0.72	0.36	318.
29	MAY	0000	29	0.00	49.5	1.22	0.72	0.50	0.00	0.0	0.00	1.22	0.72	0.50	325.
30	MAY	0000	30	0.00	52.0	1.40	0.72	0.68	0.00	0.0	0.00	1.40	0.72	0.68	334.
31	MAY	0000	31	0.20	52.0	1.40	0.63	0.77	0.20	0.09	0.11	1.60	0.72	0.88	359.
1	JUN	0000	32	0.30	48.0	1.12	0.57	0.55	0.30	0.15	0.15	1.42	0.72	0.70	391.
2	JUN	0000	33	0.10	45.0	0.91	0.65	0.26	0.10	0.07	0.03	1.01	0.72	0.29	405.
3	JUN	0000	34	0.00	47.0	1.05	0.72	0.33	0.00	0.0	0.00	1.05	0.72	0.33	394.
4	JUN	0000	35	0.30	47.5	1.08	0.56	0.52	0.30	0.16	0.14	1.38	0.72	0.56	386.
5	JUN	0000	36	0.10	49.5	1.22	0.67	0.56	0.10	0.05	0.05	1.32	0.72	0.50	390.
6	JUN	0000	37	0.10	52.0	1.40	0.67	0.73	0.10	0.05	0.05	1.50	0.72	0.78	406.
7	JUN	0000	38	0.30	52.0	1.40	0.59	0.81	0.30	0.13	0.17	1.70	0.72	0.98	431.
8	JUN	0000	39	1.10	48.0	1.12	0.36	0.76	1.10	0.36	0.74	2.22	0.72	1.50	479.
9	JUN	0000	40	1.10	42.3	0.72	0.29	0.44	1.10	0.43	0.67	1.82	0.72	1.10	542.
10	JUN	0000	41	0.00	42.3	0.72	0.72	0.00	0.00	0.0	0.00	0.72	0.72	0.00	565.
11	JUN	0000	42	0.20	56.0	1.68	0.64	1.04	0.20	0.08	0.12	1.88	0.72	1.16	548.
12	JUN	0000	43	0.00	57.5	1.78	0.72	1.06	0.0	0.0	0.0	1.78	0.72	1.06	559.
13	JUN	0000	44	0.30	62.0	2.10	0.52	1.58	0.80	0.20	0.60	2.90	0.72	2.18	619.
14	JUN	0000	45	1.30	56.5	1.71	0.41	1.31	1.30	0.31	0.99	3.01	0.72	2.29	726.
15	JUN	0000	46	1.30	53.5	1.50	0.39	1.12	1.30	0.33	0.97	2.80	0.72	2.08	848.
16	JUN	0000	47	0.10	56.0	1.68	0.68	1.00	0.10	0.04	0.06	1.78	0.72	1.06	924.
17	JUN	0000	48	0.90	57.5	1.78	0.48	1.31	0.90	0.24	0.66	2.68	0.72	1.96	954.
18	JUN	0000	49	0.20	56.0	1.68	0.64	1.04	0.20	0.08	0.12	1.88	0.72	1.16	979.
19	JUN	0000	50	0.30	57.5	1.78	0.62	1.17	0.30	0.10	0.20	2.08	0.72	1.36	989.
20	JUN	0000	51	0.30	62.0	1.74	0.61	1.13	0.30	0.11	0.19	2.04	0.72	1.32	986.
21	JUN	0000	52	0.20	56.5	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	957.
22	JUN	0000	53	0.00	53.5	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	865.
23	JUN	0000	54	0.00	56.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	752.
24	JUN	0000	55	0.20	57.5	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	654.
25	JUN	0000	56	0.0	42.3	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	568.
26	JUN	0000	57	0.00	42.3	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	495.
27	JUN	0000	58	0.10	42.3	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	431.
28	JUN	0000	59	0.30	42.3	0.0	0.0	0.0	0.30	0.30	0.00	0.30	0.30	0.00	376.
29	JUN	0000	60	0.00	42.3	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	328.
30	JUN	0000	61	0.00	42.3	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.00	0.00	286.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 10-DAY	30-DAY	90-DAY	60.0-DAY
969.	1176.00	(CFS)	895.	610.	398.	398.
		(INCHES)	12.321	25.218	32.906	32.906
		(AC-FT)	17763.	36313.	47385.	47385.

CUMULATIVE AREA = 27.00 SQ MI

Table A9

Design Temperature Sequence for Study Condition 2

Date		Mean Daily Temperature, °F	Comments	Accummulated Degree Days
May	1	28.9		
	2	28.9		
	3	28.9		
	4	28.9	Mean Daily May 1 Value "Extended" Using Hebgen Dam	
	5	28.9		
	6	28.9		
	7	28.9		0
	8	37.2	Mean Daily May 15 "Extended"	5.2
	9	46.5		19.7
	10	47.5		35.2
	11	44.5		47.7
	12	44.0		59.7
	13	46.5		74.2
	14	36.5		78.7
	15	32.5	Average 14-Day Temp Sequence for the	79.2
	16	33.5	Max 14-Day Sequence for May	80.7
	17	38.5		87.2
	18	36.5		91.2
	19	36.5		96.2
	20	42.5		106.7
	21	43.0		117.7
	22	45.0		130.7
	23	37.5	Mean Daily June 1 "Extended"	136.2
	24	37.5	Mean Daily June 1 "Extended"	141.7

Table A9 (continued)

Design Temperature Sequence for Study Condition 2

Date	Mean Daily Temperature, °F	Comments	Accummulated Degree Days
May 25	45		154.7
26	47		169.7
27	47.5		185.2
28	49.5	Max 7-Day May Temp Sequence	202.7
29	52		222.7
30	52		242.7
31	48		258.7
June 1	45		271.7
2	47		286.7
3	47.5		302.2
4	49.5	Max 7-Day May Temp Sequence	319.7
5	52		339.7
6	52		359.7
7	48		375.7
8	42.3	Mean Daily June 15 "Extended"	386.0
9	42.3		396.3
10	56		420.3
11	57.5		445.8
12	62		475.8
13	56.5	Max 7-Day June Temp Sequence	500.3
14	53.5		521.8
15	56.0		545.8
16	57.5		571.3

Table A9 (continued)

Design Temperature Sequence for Study Condition 2

Date	Mean Daily Temperature, °F	Comments	Accummulated Degree Days
June 17	56		595.3
18	57.5		620.8
19	62		650.8
20	56.5	Max 7-Day June Temp Sequence	675.3
21	53.5		696.8
22	56		720.8
23	57.5		746.3
24	42.3		
25	42.3		
26	42.3		
27	42.3		
28	42.3		
29	42.3		
30	42.3		
July 1	42.3	Mean Daily June 15 "Extended"	
2	42.3		
3	42.3		
4	42.3		
5	42.3		
6	42.3		
7	42.3		

Table A10

Design Temperature Sequence for Study Condition 3

Date	Mean Daily Temperature, °F	Comments	Accummulated Degree Days
May 1	28.9		
2	28.9		
3	28.9	Mean Daily May 1 Value "Extended" Using Hebgen Dam	
4	28.9		
5	28.9		
6	28.9		
7	28.9		0
8	37.2		5.2
9	37.2		10.4
10	37.2		15.6
11	37.2	Mean Daily May 15 Value "Extended" Using Hebgen Dam	20.8
12	37.2		26.0
13	37.2		31.2
14	37.2		36.4
15	37.2		41.6
16	45.0		54.6
17	47.0		69.6
18	47.5		85.1
19	49.5	Max 7-Day for May	102.6
20	52.0		122.6
21	52.0		142.6
22	48.0		158.6

Table A10 (continued)

Design Temperature Sequence for Study Condition 3

Date	Mean Daily Temperature, °F	Comments	Accummulated Degree Days
May 23	49.5		176.1
24	52.0	Max 3-Day for May	196.1
25	52.0		216.1
26	49.5		233.6
27	52.0	Max 3-Day for May	253.6
28	52.0		273.6
29	49.5		291.1
30	52.0	Max 3-Day for May	311.1
31	52.0		331.1
June 1	56.0		355.1
2	57.5		380.6
3	62.0		410.6
4	56.5	Max 7-Day for June	435.1
5	53.5		456.6
6	56.0		480.6
7	57.5		506.1
8	57.0		531.1
9	57.0	Max 3-Day for June	556.1
10	62.5		586.6
11	57.0		611.6
12	57.0	Max 3-Day for June	636.6
13	62.5		667.1

Table A10 (continued)

Design Temperature Sequence for Study Condition 3

Date	Mean Daily Temperature, °F	Comments	Accummulated Degree Days
June 14	42.3		677.9
15	42.3	Mean Daily June 15 "Extended"	688.2
16	42.3		698.5
17	56.0		722.5
18	57.5		748.0
19	62.0	Max 7-Day for June	778.0
20	56.5		802.5
21	53.5		824.0
22	56.0		
23	57.5		
24	42.3		
25	42.3		
26	42.3		
27	42.3	Mean Daily June 15 "Extended"	
28	42.3		
29	42.3		
30	42.3		

Table A11
Study Condition 3A

DA	MON	HRMN	JDO	PRECIP	TEMP	SNOMELT	SNOLOSS	SNOEXCS	RAIN	RAINLOS	RAINEXS	SNO+RAIN	LOSS	EXCESS	COMP Q
1	MAY	0000	1	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
2	MAY	0000	2	0.60	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
3	MAY	0000	3	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
4	MAY	0000	4	0.30	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
5	MAY	0000	5	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
6	MAY	0000	6	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
7	MAY	0000	7	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
8	MAY	0000	8	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
9	MAY	0000	9	0.20	37.2	0.47	0.47	0.00	0.20	0.20	0.00	0.67	0.67	0.00	25.
10	MAY	0000	10	0.50	37.2	0.47	0.32	0.15	0.60	0.40	0.20	1.07	0.72	0.35	33.
11	MAY	0000	11	1.10	37.2	0.47	0.21	0.25	1.10	0.51	0.59	1.57	0.72	0.85	69.
12	MAY	0000	12	0.10	37.2	0.47	0.47	0.00	0.10	0.10	0.00	0.57	0.57	0.00	113.
13	MAY	0000	13	0.0	37.2	0.47	0.47	0.00	0.0	0.0	0.0	0.47	0.47	0.00	123.
14	MAY	0000	14	0.60	37.2	0.47	0.39	0.08	0.60	0.33	0.27	0.87	0.72	0.15	114.
15	MAY	0000	15	0.0	37.2	0.47	0.47	0.00	0.0	0.0	0.0	0.47	0.47	0.00	109.
16	MAY	0000	16	0.0	37.2	0.47	0.47	0.00	0.0	0.0	0.0	0.47	0.47	0.00	102.
17	MAY	0000	17	0.90	65.0	1.17	0.41	0.76	0.90	0.31	0.59	2.07	0.72	1.35	122.
18	MAY	0000	18	0.10	67.0	1.35	0.67	0.68	0.10	0.05	0.05	1.45	0.72	0.73	192.
19	MAY	0000	19	0.20	67.5	1.39	0.63	0.77	0.20	0.09	0.11	1.59	0.72	0.87	260.
20	MAY	0000	20	0.0	69.5	1.57	0.72	0.85	0.0	0.0	0.0	1.57	0.72	0.85	310.
21	MAY	0000	21	0.0	52.0	1.80	0.72	1.08	0.0	0.0	0.0	1.80	0.72	1.08	362.
22	MAY	0000	22	0.0	52.0	1.80	0.72	1.08	0.0	0.0	0.0	1.80	0.72	1.08	416.
23	MAY	0000	23	0.10	48.0	1.44	0.67	0.77	0.10	0.05	0.05	1.56	0.72	0.82	463.
24	MAY	0000	24	0.50	69.5	1.57	0.55	1.03	0.50	0.17	0.33	2.07	0.72	1.35	504.
25	MAY	0000	25	1.30	52.0	1.80	0.42	1.38	1.30	0.30	1.00	3.10	0.72	2.38	582.
26	MAY	0000	26	1.10	52.0	1.80	0.45	1.35	1.10	0.27	0.83	2.90	0.72	2.18	709.
27	MAY	0000	27	0.10	69.5	1.57	0.68	0.90	0.10	0.04	0.06	1.67	0.72	0.95	807.
28	MAY	0000	28	0.30	52.0	1.80	0.62	1.18	0.30	0.10	0.20	2.10	0.72	1.38	837.
29	MAY	0000	29	0.0	52.0	1.80	0.72	1.08	0.0	0.0	0.0	1.80	0.72	1.08	846.
30	MAY	0000	30	0.50	69.5	1.57	0.55	1.03	0.50	0.17	0.33	2.07	0.72	1.35	855.
31	MAY	0000	31	0.60	52.0	1.80	0.59	1.21	0.60	0.13	0.27	2.20	0.72	1.48	871.
1	JUN	0000	32	0.10	52.0	1.80	0.68	1.12	0.10	0.04	0.06	1.90	0.72	1.18	892.
2	JUN	0000	33	0.10	55.0	2.16	0.69	1.47	0.10	0.03	0.07	2.25	0.72	1.54	907.
3	JUN	0000	34	0.0	57.5	2.29	0.72	1.57	0.0	0.0	0.0	2.29	0.72	1.57	930.
4	JUN	0000	35	0.20	52.0	2.70	0.67	2.03	0.20	0.05	0.15	2.90	0.72	2.18	975.
5	JUN	0000	36	0.0	56.5	2.20	0.72	1.48	0.0	0.0	0.0	2.20	0.72	1.48	1029.
6	JUN	0000	37	0.10	53.5	1.93	0.68	1.25	0.10	0.04	0.06	2.03	0.72	1.31	1053.
7	JUN	0000	38	0.30	56.0	2.16	0.53	1.63	0.80	0.19	0.61	2.95	0.72	2.24	1070.
8	JUN	0000	39	0.10	57.5	2.29	0.69	1.61	0.10	0.03	0.07	2.39	0.72	1.67	1111.
9	JUN	0000	40	0.0	57.0	2.25	0.72	1.53	0.0	0.0	0.0	2.25	0.72	1.53	1140.
10	JUN	0000	41	0.0	57.0	2.25	0.72	1.53	0.0	0.0	0.0	2.25	0.72	1.53	1143.
11	JUN	0000	42	0.10	62.5	2.74	0.69	2.05	0.10	0.03	0.07	2.84	0.72	2.12	1156.
12	JUN	0000	43	0.70	57.0	2.25	0.55	1.70	0.70	0.17	0.53	2.95	0.72	2.23	1199.
13	JUN	0000	44	0.0	57.0	2.25	0.72	1.53	0.0	0.0	0.0	2.25	0.72	1.53	1240.
14	JUN	0000	45	0.0	62.5	2.74	0.72	2.02	0.0	0.0	0.0	2.74	0.72	2.02	1256.
15	JUN	0000	46	0.80	62.3	0.93	0.39	0.54	0.80	0.33	0.47	1.73	0.72	1.01	1252.
16	JUN	0000	47	0.90	62.3	0.93	0.37	0.56	0.90	0.35	0.55	1.83	0.72	1.11	1214.
17	JUN	0000	48	0.0	62.3	0.93	0.72	0.21	0.0	0.0	0.0	0.93	0.72	0.21	1138.
18	JUN	0000	49	0.10	56.0	2.08	0.69	1.39	0.10	0.03	0.07	2.18	0.72	1.46	1050.
19	JUN	0000	50	0.10	57.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	997.
20	JUN	0000	51	0.10	62.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	903.
21	JUN	0000	52	0.30	56.5	0.0	0.0	0.0	0.30	0.30	0.00	0.30	0.30	0.00	795.
22	JUN	0000	53	0.40	53.5	0.0	0.0	0.0	0.40	0.36	0.04	0.40	0.36	0.04	683.
23	JUN	0000	54	0.10	56.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	595.
24	JUN	0000	55	0.20	57.5	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	518.
25	JUN	0000	56	0.10	62.3	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	451.
26	JUN	0000	57	0.20	62.3	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	393.
27	JUN	0000	58	0.0	62.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	342.
28	JUN	0000	59	0.0	62.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.
29	JUN	0000	60	0.0	62.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.
30	JUN	0000	61	0.0	62.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 10-DAY	30-DAY	90-DAY	60.0-DAY
1256.	1056.00	(CFS)	1132.	973.	597.	587.
		(INCHES)	16.283	40.222	49.524	48.524
		(AC-FT)	23448.	57920.	69875.	59975.

CUMULATIVE AREA = 27.00 SQ MI

Table A12
Study Condition 3B

DA	MON	HRMN	ORD	PRECIP	TEMP	SNOMELT	SNOLOSS	SNOEXCS	RAIN	RAINLOS	RAINEXS	SNO+RAIN	LOSS	EXCESS	COMP Q
1	MAY	0000	1	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
2	MAY	0000	2	0.40	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
3	MAY	0000	3	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
4	MAY	0000	4	0.30	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
5	MAY	0000	5	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
6	MAY	0000	6	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
7	MAY	0000	7	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
8	MAY	0000	8	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
9	MAY	0000	9	0.20	37.2	0.52	0.52	0.00	0.20	0.20	0.00	0.72	0.72	0.00	25.
10	MAY	0000	10	0.60	37.2	0.52	0.33	0.19	0.60	0.39	0.21	1.12	0.72	0.40	34.
11	MAY	0000	11	1.10	37.2	0.52	0.23	0.29	1.10	0.49	0.81	1.62	0.72	0.90	73.
12	MAY	0000	12	0.10	37.2	0.52	0.52	0.00	0.10	0.10	0.00	0.62	0.62	0.00	121.
13	MAY	0000	13	0.0	37.2	0.52	0.52	0.00	0.0	0.0	0.0	0.52	0.52	0.00	132.
14	MAY	0000	14	0.40	37.2	0.52	0.41	0.11	0.40	0.31	0.09	0.92	0.72	0.20	122.
15	MAY	0000	15	0.0	37.2	0.52	0.52	0.00	0.0	0.0	0.0	0.52	0.52	0.00	119.
16	MAY	0000	16	0.0	37.2	0.52	0.52	0.00	0.0	0.0	0.0	0.52	0.52	0.00	111.
17	MAY	0000	17	0.30	45.0	1.30	0.43	0.87	0.30	0.29	0.01	2.20	0.72	1.48	134.
18	MAY	0000	18	0.10	47.0	1.50	0.67	0.82	0.10	0.06	0.05	1.60	0.72	0.88	212.
19	MAY	0000	19	0.20	47.5	1.55	0.64	0.91	0.20	0.08	0.12	1.75	0.72	1.03	292.
20	MAY	0000	20	0.0	49.5	1.75	0.72	1.03	0.0	0.0	0.0	1.75	0.72	1.03	353.
21	MAY	0000	21	0.0	52.0	2.00	0.72	1.28	0.0	0.0	0.0	2.00	0.72	1.28	416.
22	MAY	0000	22	0.0	52.0	2.00	0.72	1.28	0.0	0.0	0.0	2.00	0.72	1.28	482.
23	MAY	0000	23	0.10	48.0	1.60	0.68	0.92	0.10	0.06	0.06	1.70	0.72	0.98	539.
24	MAY	0000	24	0.50	49.5	1.75	0.56	1.19	0.50	0.16	0.34	2.25	0.72	1.53	587.
25	MAY	0000	25	1.30	52.0	2.00	0.44	1.56	1.30	0.28	1.02	3.30	0.72	2.58	671.
26	MAY	0000	26	1.10	52.0	2.00	0.46	1.54	1.10	0.26	0.84	3.10	0.72	2.38	804.
27	MAY	0000	27	0.10	49.5	1.75	0.68	1.07	0.10	0.04	0.06	1.85	0.72	1.13	909.
28	MAY	0000	28	0.30	52.0	2.00	0.63	1.37	0.30	0.09	0.21	2.30	0.72	1.58	946.
29	MAY	0000	29	0.0	52.0	2.00	0.72	1.28	0.0	0.0	0.0	2.00	0.72	1.28	957.
30	MAY	0000	30	0.50	49.5	1.75	0.56	1.19	0.50	0.16	0.34	2.25	0.72	1.53	970.
31	MAY	0000	31	0.40	52.0	2.00	0.60	1.40	0.40	0.12	0.28	2.40	0.72	1.68	939.
1	JUN	0000	32	0.10	52.0	2.00	0.69	1.31	0.10	0.03	0.07	2.10	0.72	1.38	1013.
2	JUN	0000	33	0.10	56.0	2.40	0.69	1.71	0.10	0.03	0.07	2.50	0.72	1.78	1032.
3	JUN	0000	34	0.0	57.5	2.55	0.72	1.83	0.0	0.0	0.0	2.55	0.72	1.83	1061.
4	JUN	0000	35	0.20	52.0	3.00	0.68	2.32	0.20	0.05	0.15	3.20	0.72	2.48	1114.
5	JUN	0000	36	0.0	56.5	2.45	0.72	1.73	0.0	0.0	0.0	2.45	0.72	1.73	1176.
6	JUN	0000	37	0.10	53.5	2.15	0.69	1.46	0.10	0.03	0.07	2.25	0.72	1.53	1205.
7	JUN	0000	38	0.60	56.0	2.40	0.54	1.86	0.60	0.18	0.42	3.00	0.72	2.28	1224.
8	JUN	0000	39	0.10	57.5	2.55	0.69	1.86	0.10	0.03	0.07	2.65	0.72	1.93	1267.
9	JUN	0000	40	0.0	57.0	2.50	0.72	1.78	0.0	0.0	0.0	2.50	0.72	1.78	1300.
10	JUN	0000	41	0.0	57.0	2.50	0.72	1.78	0.0	0.0	0.0	2.50	0.72	1.78	1306.
11	JUN	0000	42	0.10	52.5	3.05	0.70	2.35	0.10	0.02	0.08	3.15	0.72	2.43	1323.
12	JUN	0000	43	0.70	57.0	2.50	0.56	1.94	0.70	0.15	0.54	3.20	0.72	2.48	1370.
13	JUN	0000	44	0.0	57.0	2.50	0.72	1.78	0.0	0.0	0.0	2.50	0.72	1.78	1414.
14	JUN	0000	45	0.0	52.5	1.24	0.72	0.52	0.0	0.0	0.0	1.24	0.72	0.52	1390.
15	JUN	0000	46	0.80	42.3	0.0	0.0	0.0	0.80	0.35	0.45	0.80	0.35	0.45	1289.
16	JUN	0000	47	0.90	42.3	0.0	0.0	0.0	0.90	0.35	0.55	0.90	0.35	0.55	1167.
17	JUN	0000	48	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1051.
18	JUN	0000	49	0.10	56.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	926.
19	JUN	0000	50	0.10	57.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	804.
20	JUN	0000	51	0.10	62.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	698.
21	JUN	0000	52	0.30	56.5	0.0	0.0	0.0	0.30	0.30	0.00	0.30	0.30	0.00	607.
22	JUN	0000	53	0.40	53.5	0.0	0.0	0.0	0.40	0.36	0.04	0.40	0.36	0.04	529.
23	JUN	0000	54	0.10	56.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	462.
24	JUN	0000	55	0.20	57.5	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	403.
25	JUN	0000	56	0.10	42.3	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	353.
26	JUN	0000	57	0.20	42.3	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	353.
27	JUN	0000	58	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	353.
28	JUN	0000	59	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	353.
29	JUN	0000	60	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	353.
30	JUN	0000	61	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	353.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 10-DAY	30-DAY	90-DAY	60.0-DAY
1414.	1032.00	(CFS)	1337.	1037.	621.	621.
		(INCHES)	18.000	42.339	51.320	51.320
		(AC-FT)	25920.	61638.	73901.	73901.

CUMULATIVE AREA = 27.00 SQ MI

Table A13
Study Condition 3C

DA	MON	HRMN	ORD	PRECIP	TEMP	SNOMELT	SNOLOSS	SNOEXCS	RAIN	RAINLOS	RAINEXS	SNO+RAIN	LOSS	EXCESS	COMP Q
1	MAY	0000	1	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
2	MAY	0000	2	0.40	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
3	MAY	0000	3	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
4	MAY	0000	4	0.30	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
5	MAY	0000	5	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
6	MAY	0000	6	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
7	MAY	0000	7	0.10	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
8	MAY	0000	8	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.
9	MAY	0000	9	0.20	37.2	0.79	0.57	0.21	0.20	0.15	0.05	0.93	0.72	0.26	31.
10	MAY	0000	10	0.50	37.2	0.78	0.41	0.37	0.50	0.31	0.29	1.38	0.72	0.56	58.
11	MAY	0000	11	1.10	37.2	0.78	0.30	0.48	1.10	0.62	0.58	1.88	0.72	1.16	119.
12	MAY	0000	12	0.10	37.2	0.78	0.64	0.14	0.10	0.03	0.02	0.88	0.72	0.16	136.
13	MAY	0000	13	0.0	37.2	0.78	0.72	0.05	0.0	0.0	0.0	0.78	0.72	0.06	202.
14	MAY	0000	14	0.60	37.2	0.78	0.48	0.30	0.60	0.24	0.16	1.38	0.72	0.66	197.
15	MAY	0000	15	0.0	37.2	0.78	0.72	0.05	0.0	0.0	0.0	0.78	0.72	0.06	199.
16	MAY	0000	16	0.0	37.2	0.78	0.72	0.05	0.0	0.0	0.0	0.78	0.72	0.06	192.
17	MAY	0000	17	0.90	45.0	1.95	0.49	1.46	0.90	0.23	0.67	2.85	0.72	2.13	223.
18	MAY	0000	18	0.10	47.0	2.25	0.59	1.55	0.10	0.03	0.07	2.35	0.72	1.63	339.
19	MAY	0000	19	0.20	47.5	2.32	0.66	1.65	0.20	0.06	0.14	2.52	0.72	1.80	473.
20	MAY	0000	20	0.0	49.5	2.62	0.72	1.90	0.0	0.0	0.0	2.62	0.72	1.90	598.
21	MAY	0000	21	0.0	52.0	3.00	0.72	2.28	0.0	0.0	0.0	3.00	0.72	2.28	705.
22	MAY	0000	22	0.0	52.0	3.00	0.72	2.28	0.0	0.0	0.0	3.00	0.72	2.28	827.
23	MAY	0000	23	0.10	48.0	2.40	0.69	1.71	0.10	0.03	0.07	2.50	0.72	1.78	931.
24	MAY	0000	24	0.50	49.5	2.62	0.60	2.02	0.50	0.12	0.38	3.12	0.72	2.40	1011.
25	MAY	0000	25	1.30	52.0	3.00	0.50	2.50	1.30	0.22	1.08	4.30	0.72	3.58	1125.
26	MAY	0000	26	1.10	52.0	3.00	0.53	2.47	1.10	0.19	0.91	4.10	0.72	3.38	1232.
27	MAY	0000	27	0.10	49.5	2.62	0.69	1.93	0.10	0.03	0.07	2.72	0.72	2.00	1426.
28	MAY	0000	28	0.30	52.0	3.00	0.65	2.35	0.30	0.07	0.23	3.30	0.72	2.58	1483.
29	MAY	0000	29	0.0	52.0	3.00	0.72	2.23	0.0	0.0	0.0	3.00	0.72	2.23	1518.
30	MAY	0000	30	0.50	49.5	2.62	0.50	2.02	0.50	0.12	0.38	3.12	0.72	2.40	1551.
31	MAY	0000	31	0.40	52.0	3.00	0.56	2.35	0.40	0.03	0.32	3.40	0.72	2.68	1534.
1	JUN	0000	32	0.10	52.0	3.00	0.70	2.30	0.10	0.02	0.08	3.10	0.72	2.38	1522.
2	JUN	0000	33	0.10	56.0	3.60	0.70	2.90	0.10	0.02	0.08	3.70	0.72	2.98	1551.
3	JUN	0000	34	0.0	57.5	3.82	0.72	3.10	0.0	0.0	0.0	3.82	0.72	3.10	1720.
4	JUN	0000	35	0.20	52.0	4.50	0.69	3.81	0.20	0.03	0.17	4.70	0.72	3.98	1812.
5	JUN	0000	36	0.0	56.5	3.31	0.72	2.59	0.0	0.0	0.0	3.31	0.72	2.59	1906.
6	JUN	0000	37	0.10	53.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	1833.
7	JUN	0000	38	0.30	56.0	0.0	0.0	0.0	0.30	0.33	0.07	0.80	0.33	0.07	1711.
8	JUN	0000	39	0.10	57.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	1507.
9	JUN	0000	40	0.0	57.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1319.
10	JUN	0000	41	0.0	57.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1163.
11	JUN	0000	42	0.10	62.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	992.
12	JUN	0000	43	0.70	57.0	0.0	0.0	0.0	0.70	0.34	0.36	0.70	0.34	0.36	869.
13	JUN	0000	44	0.0	57.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	772.
14	JUN	0000	45	0.0	52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	680.
15	JUN	0000	46	0.80	42.3	0.0	0.0	0.0	0.80	0.35	0.45	0.80	0.35	0.45	602.
16	JUN	0000	47	0.90	42.3	0.0	0.0	0.0	0.90	0.35	0.55	0.90	0.35	0.55	539.
17	JUN	0000	48	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	525.
18	JUN	0000	49	0.10	56.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	477.
19	JUN	0000	50	0.10	57.5	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	477.
20	JUN	0000	51	0.10	52.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	477.
21	JUN	0000	52	0.30	56.5	0.0	0.0	0.0	0.30	0.30	0.00	0.30	0.30	0.00	477.
22	JUN	0000	53	0.40	53.5	0.0	0.0	0.0	0.40	0.36	0.04	0.40	0.36	0.04	477.
23	JUN	0000	54	0.10	56.0	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	477.
24	JUN	0000	55	0.20	57.5	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	477.
25	JUN	0000	56	0.10	42.3	0.0	0.0	0.0	0.10	0.10	0.00	0.10	0.10	0.00	477.
26	JUN	0000	57	0.20	42.3	0.0	0.0	0.0	0.20	0.20	0.00	0.20	0.20	0.00	477.
27	JUN	0000	58	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	477.
28	JUN	0000	59	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	477.
29	JUN	0000	60	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	477.
30	JUN	0000	61	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	477.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 10-DAY	30-DAY	90-DAY	60.0-DAY
1936.	840.00	(CFS)	1636.	1193.	728.	728.
		(INCHES)	23.365	43.313	60.175	50.176
		(AC-FT)	33645.	71010.	85654.	96554.

CUMULATIVE AREA = 27.00 SQ MI

Table A14

Temperature Sequence Comparison

Sequence Description	Calendar Dates for Design Condition	Accumulated Number of Degree Days	Comparison Comments
Maximum 7-Day	June 7-13	186.5	7% greater than actually occurred in 1974
Maximum 14-Day	May 31-June 13	356	10% greater than actually occurred in 1974
Maximum 21-Day	June 1-21	493	8% greater than actually occurred in 1974
Maximum 28-Day	May 25-June 21	627.9	22% greater than actually occurred in 1977

Table A15
Study Condition 4A

DA	MON	HRMN	JRD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	JRD	RAIN	LOSS	EXCESS	COMP Q
1	JUN	0000	1	0.0	0.0	0.0	260.	1	JUN	0900	37	0.0	0.0	0.0	8719.
1	JUN	0015	2	0.09	0.01	0.08	267.	1	JUN	0915	38	0.0	0.0	0.0	8510.
1	JUN	0030	3	0.10	0.01	0.09	293.	1	JUN	0930	39	0.0	0.0	0.0	8306.
1	JUN	0045	4	0.11	0.01	0.10	349.	1	JUN	0945	40	0.0	0.0	0.0	8103.
1	JUN	0100	5	0.11	0.01	0.10	442.	1	JUN	1000	41	0.0	0.0	0.0	7914.
1	JUN	0115	6	0.12	0.01	0.11	570.	1	JUN	1015	42	0.0	0.0	0.0	7725.
1	JUN	0130	7	0.13	0.01	0.12	725.	1	JUN	1030	43	0.0	0.0	0.0	7541.
1	JUN	0145	8	0.56	0.01	0.55	931.	1	JUN	1045	44	0.0	0.0	0.0	7361.
1	JUN	0200	9	0.71	0.01	0.70	1255.	1	JUN	1100	45	0.0	0.0	0.0	7186.
1	JUN	0215	10	1.25	0.01	1.24	1812.	1	JUN	1115	46	0.0	0.0	0.0	7015.
1	JUN	0230	11	3.11	0.01	3.10	2861.	1	JUN	1130	47	0.0	0.0	0.0	6843.
1	JUN	0245	12	0.37	0.01	0.36	4493.	1	JUN	1145	48	0.0	0.0	0.0	6685.
1	JUN	0300	13	0.35	0.01	0.34	6453.	1	JUN	1200	49	0.0	0.0	0.0	6526.
1	JUN	0315	14	0.27	0.01	0.26	8390.	1	JUN	1215	50	0.0	0.0	0.0	6372.
1	JUN	0330	15	0.23	0.01	0.22	9961.	1	JUN	1230	51	0.0	0.0	0.0	6221.
1	JUN	0345	16	0.23	0.01	0.22	10977.	1	JUN	1245	52	0.0	0.0	0.0	6074.
1	JUN	0400	17	0.16	0.01	0.15	11422.	1	JUN	1300	53	0.0	0.0	0.0	5930.
1	JUN	0415	18	0.16	0.00	0.15	11564.	1	JUN	1315	54	0.0	0.0	0.0	5790.
1	JUN	0430	19	0.15	0.00	0.14	11544.	1	JUN	1330	55	0.0	0.0	0.0	5654.
1	JUN	0445	20	0.09	0.00	0.08	11472.	1	JUN	1345	56	0.0	0.01	0.0	5520.
1	JUN	0500	21	0.09	0.00	0.08	11353.	1	JUN	1400	57	0.0	0.0	0.0	5391.
1	JUN	0515	22	0.09	0.00	0.08	11194.	1	JUN	1415	58	0.0	0.0	0.0	5264.
1	JUN	0530	23	0.09	0.00	0.08	11003.	1	JUN	1430	59	0.0	0.0	0.0	5140.
1	JUN	0545	24	0.09	0.00	0.08	11392.	1	JUN	1445	60	0.0	0.0	0.0	5020.
1	JUN	0600	25	0.05	0.00	0.05	11265.	1	JUN	1500	61	0.0	0.0	0.0	4902.
1	JUN	0615	26	0.0	0.0	0.0	11126.	1	JUN	1515	62	0.0	0.0	0.0	4788.
1	JUN	0630	27	0.0	0.0	0.0	10967.	1	JUN	1530	63	0.0	0.0	0.0	4676.
1	JUN	0645	28	0.0	0.0	0.0	10781.	1	JUN	1545	64	0.0	0.0	0.0	4567.
1	JUN	0700	29	0.0	0.0	0.0	10567.	1	JUN	1600	65	0.0	0.0	0.0	4460.
1	JUN	0715	30	0.0	0.0	0.0	10332.	1	JUN	1615	66	0.0	0.0	0.0	4357.
1	JUN	0730	31	0.0	0.0	0.0	10083.	1	JUN	1630	67	0.0	0.0	0.0	4255.
1	JUN	0745	32	0.0	0.0	0.0	9845.	1	JUN	1645	68	0.0	0.0	0.0	4157.
1	JUN	0800	33	0.0	0.0	0.0	9609.	1	JUN	1700	69	0.0	0.0	0.0	4061.
1	JUN	0815	34	0.0	0.0	0.0	9373.	1	JUN	1715	70	0.0	0.0	0.0	3967.
1	JUN	0830	35	0.0	0.0	0.0	9153.	1	JUN	1730	71	0.0	0.0	0.0	3875.
1	JUN	0845	36	0.0	0.0	0.0	8933.	1	JUN	1745	72	0.0	0.0	0.0	3786.

TOTAL RAINFALL = 8.72, TOTAL LOSS = 0.14, TOTAL EXCESS = 8.58

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	17.75-HR
11672.	4.75	(CFS)	10525.	5693.	6693.	6693.
		(INCHES)	3.524	6.818	6.818	6.818
		(AC-FT)	5219.	9818.	9818.	9818.

CUMULATIVE AREA = 27.00 SQ MI

Table A16

Study Condition 4B

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	AUG	0000	1	0.0	0.0	0.0	135.
1	AUG	0015	2	0.09	0.04	0.05	139.
1	AUG	0030	3	0.10	0.04	0.06	155.
1	AUG	0045	4	0.11	0.04	0.07	191.
1	AUG	0100	5	0.11	0.04	0.07	253.
1	AUG	0115	6	0.12	0.04	0.08	339.
1	AUG	0130	7	0.13	0.04	0.09	447.
1	AUG	0145	8	0.56	0.04	0.52	584.
1	AUG	0200	9	0.71	0.04	0.67	382.
1	AUG	0215	10	1.25	0.04	1.21	1391.
1	AUG	0230	11	3.11	0.04	3.07	2395.
1	AUG	0245	12	0.37	0.04	0.33	3981.
1	AUG	0300	13	0.35	0.04	0.31	5395.
1	AUG	0315	14	0.27	0.04	0.23	7783.
1	AUG	0330	15	0.23	0.04	0.19	9315.
1	AUG	0345	16	0.23	0.04	0.19	10289.
1	AUG	0400	17	0.15	0.04	0.12	10592.
1	AUG	0415	18	0.15	0.04	0.12	10794.
1	AUG	0430	19	0.15	0.04	0.11	10834.
1	AUG	0445	20	0.09	0.04	0.05	10823.
1	AUG	0500	21	0.09	0.04	0.05	10765.
1	AUG	0515	22	0.09	0.04	0.05	10673.
1	AUG	0530	23	0.09	0.04	0.05	10543.
1	AUG	0545	24	0.09	0.04	0.05	10395.
1	AUG	0600	25	0.06	0.04	0.02	10235.
1	AUG	0615	26	0.0	0.0	0.0	10065.
1	AUG	0630	27	0.0	0.0	0.0	9883.
1	AUG	0645	28	0.0	0.0	0.0	9685.
1	AUG	0700	29	0.0	0.0	0.0	9475.
1	AUG	0715	30	0.0	0.0	0.0	9254.
1	AUG	0730	31	0.0	0.0	0.0	9031.
1	AUG	0745	32	0.0	0.0	0.0	8811.
1	AUG	0800	33	0.0	0.0	0.0	8597.
1	AUG	0815	34	0.0	0.0	0.0	8383.
1	AUG	0830	35	0.0	0.0	0.0	8184.
1	AUG	0845	36	0.0	0.0	0.0	7985.
1	AUG	0900	37	0.0	0.01	0.0	7791.
1	AUG	0915	38	0.0	0.01	0.0	7602.
1	AUG	0930	39	0.0	0.0	0.0	7418.
1	AUG	0945	40	0.0	0.0	0.0	7238.
1	AUG	1000	41	0.0	0.0	0.0	7063.
1	AUG	1015	42	0.0	0.0	0.0	6892.
1	AUG	1030	43	0.0	0.0	0.0	6725.
1	AUG	1045	44	0.0	0.0	0.0	6562.
1	AUG	1100	45	0.0	0.0	0.0	6404.
1	AUG	1115	46	0.0	0.0	0.0	6249.
1	AUG	1130	47	0.0	0.0	0.0	6098.
1	AUG	1145	48	0.0	0.0	0.0	5951.
1	AUG	1200	49	0.0	0.0	0.0	5807.
1	AUG	1215	50	0.0	0.0	0.0	5667.
1	AUG	1230	51	0.0	0.0	0.0	5530.
1	AUG	1245	52	0.0	0.0	0.0	5397.
1	AUG	1300	53	0.0	0.0	0.0	5267.
1	AUG	1315	54	0.0	0.0	0.0	5140.
1	AUG	1330	55	0.0	0.0	0.0	5017.
1	AUG	1345	56	0.0	0.0	0.0	4896.
1	AUG	1400	57	0.0	0.0	0.0	4779.
1	AUG	1415	58	0.0	0.0	0.0	4664.
1	AUG	1430	59	0.0	0.0	0.0	4552.
1	AUG	1445	60	0.0	0.0	0.0	4443.
1	AUG	1500	61	0.0	0.0	0.0	4337.
1	AUG	1515	62	0.0	0.0	0.0	4233.
1	AUG	1530	63	0.0	0.0	0.0	4132.
1	AUG	1545	64	0.0	0.0	0.0	4033.
1	AUG	1600	65	0.0	0.0	0.0	3937.
1	AUG	1615	66	0.0	0.0	0.0	3843.
1	AUG	1630	67	0.0	0.0	0.0	3752.
1	AUG	1645	68	0.0	0.0	0.0	3662.
1	AUG	1700	69	0.0	0.0	0.0	3575.
1	AUG	1715	70	0.0	0.0	0.0	3490.
1	AUG	1730	71	0.0	0.0	0.0	3407.
1	AUG	1745	72	0.0	0.0	0.0	3327.

TOTAL RAINFALL = 8.72, TOTAL LOSS = 0.91, TOTAL EXCESS = 7.81

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	17.75-HR
10834.	4.50	(CFS)	9592.	5007.	5007.	6007.
		(INCHES)	3.303	6.119	6.119	6.119
		(AC-FT)	4756.	8811.	8811.	8811.

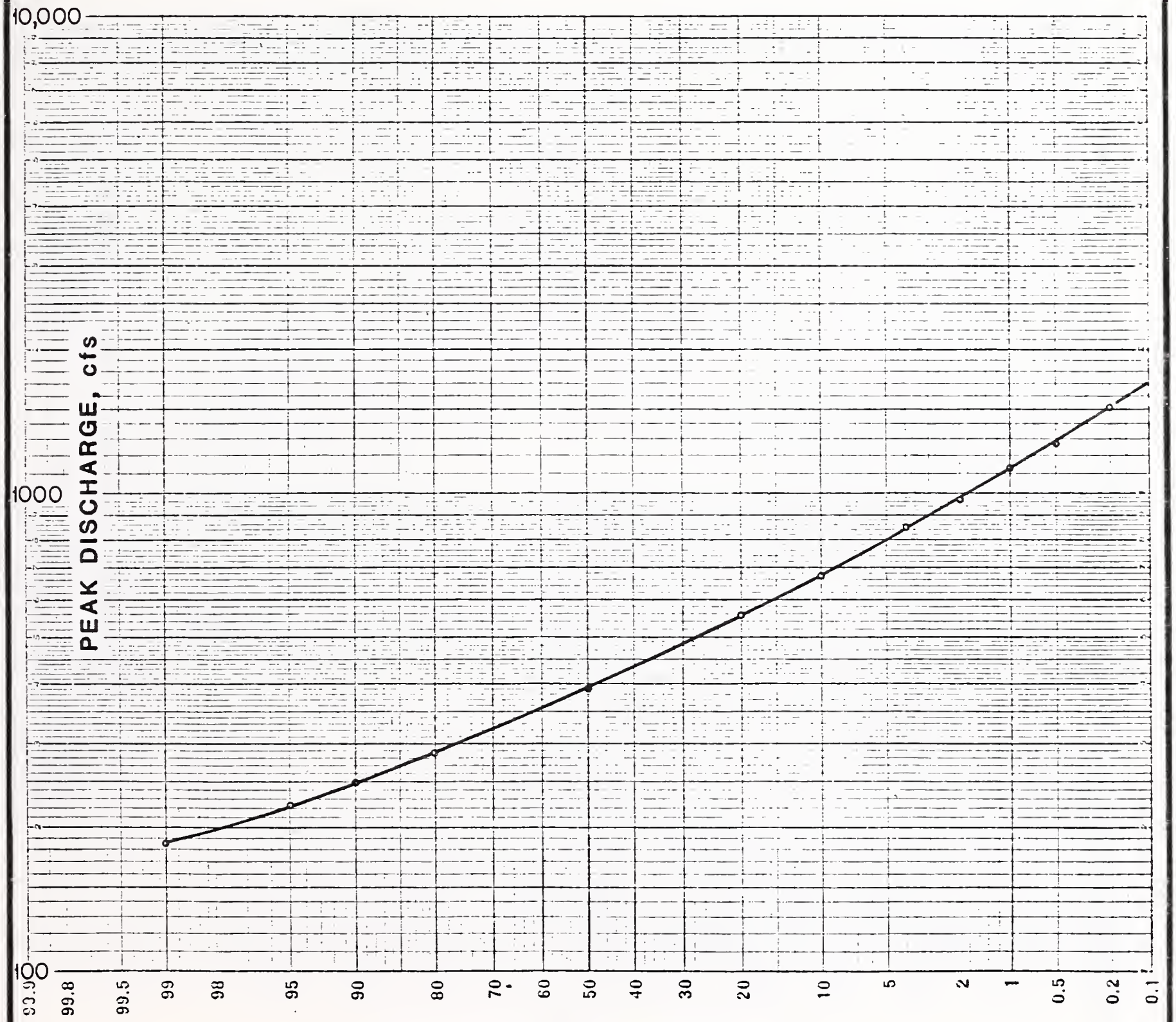
CUMULATIVE AREA = 27.00 SQ MI

APPENDIX B - STREAMFLOW DATA

APPENDIX B - FIGURES

MONTHLY STREAMFLOWS

. Hyalite Creek at Hyalite Ranger Station (1889-1982)
. Hyalite Creek at Hyalite Ranger Station (1931-1982)
. Inflow to Middle Creek Reservoir (1931-1982)



PERIOD OF RECORD :

1898, 1899, 1902, 1935 - 82

STUDY TECHNIQUE :

Log - Pearson III

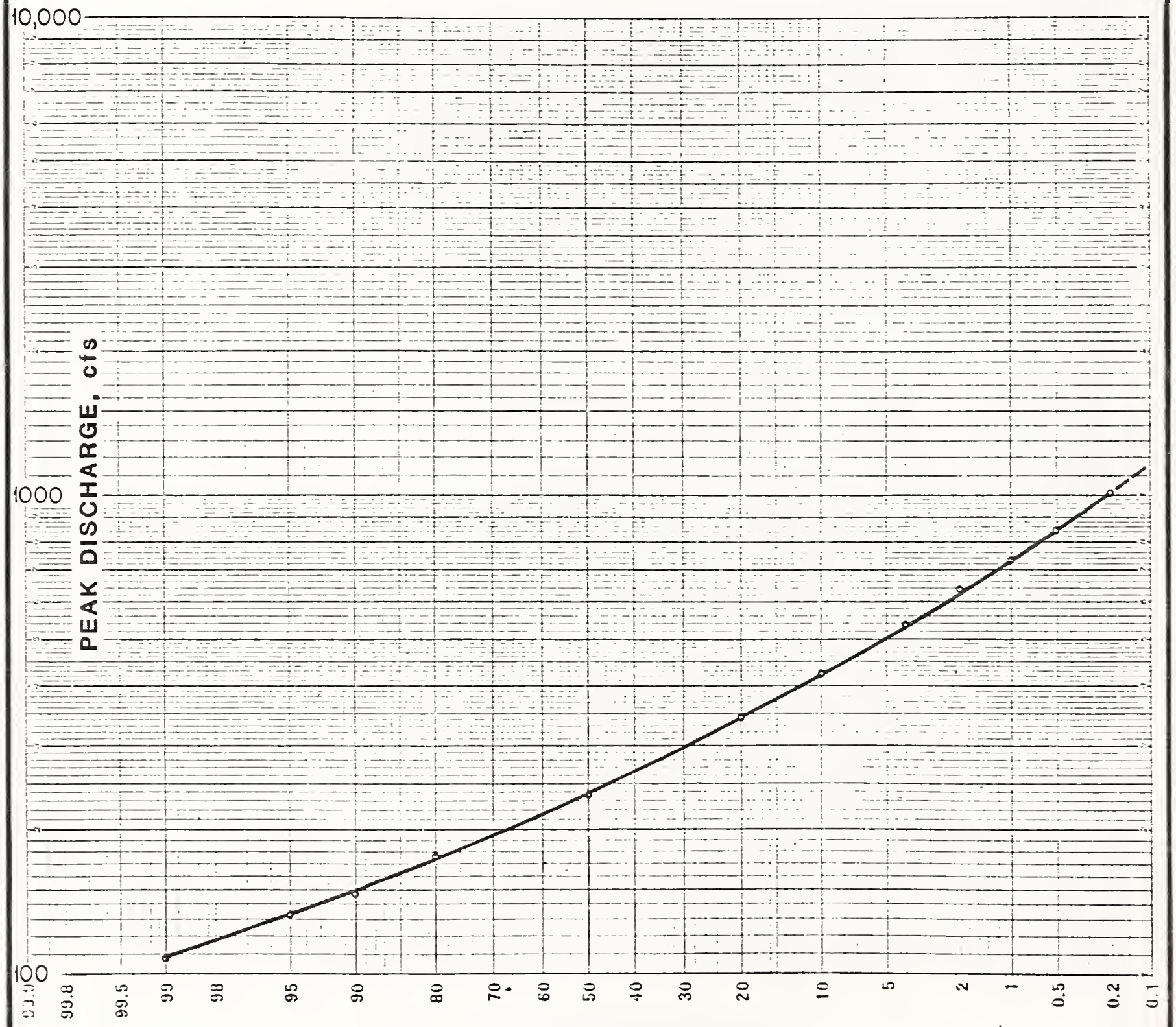
WEIGHTED SKEW = 0.4

MIDDLE CREEK DAM
PEAK DISCHARGE FREQUENCY CURVE
FOR HYALITE CREEK AT RANGER STATION GAGE

8M087.113 NOVEMBER 1983

FIGURE B1

HKM ASSOCIATES
ENGINEERS ——— PLANNERS



STUDY TECHNIQUE :

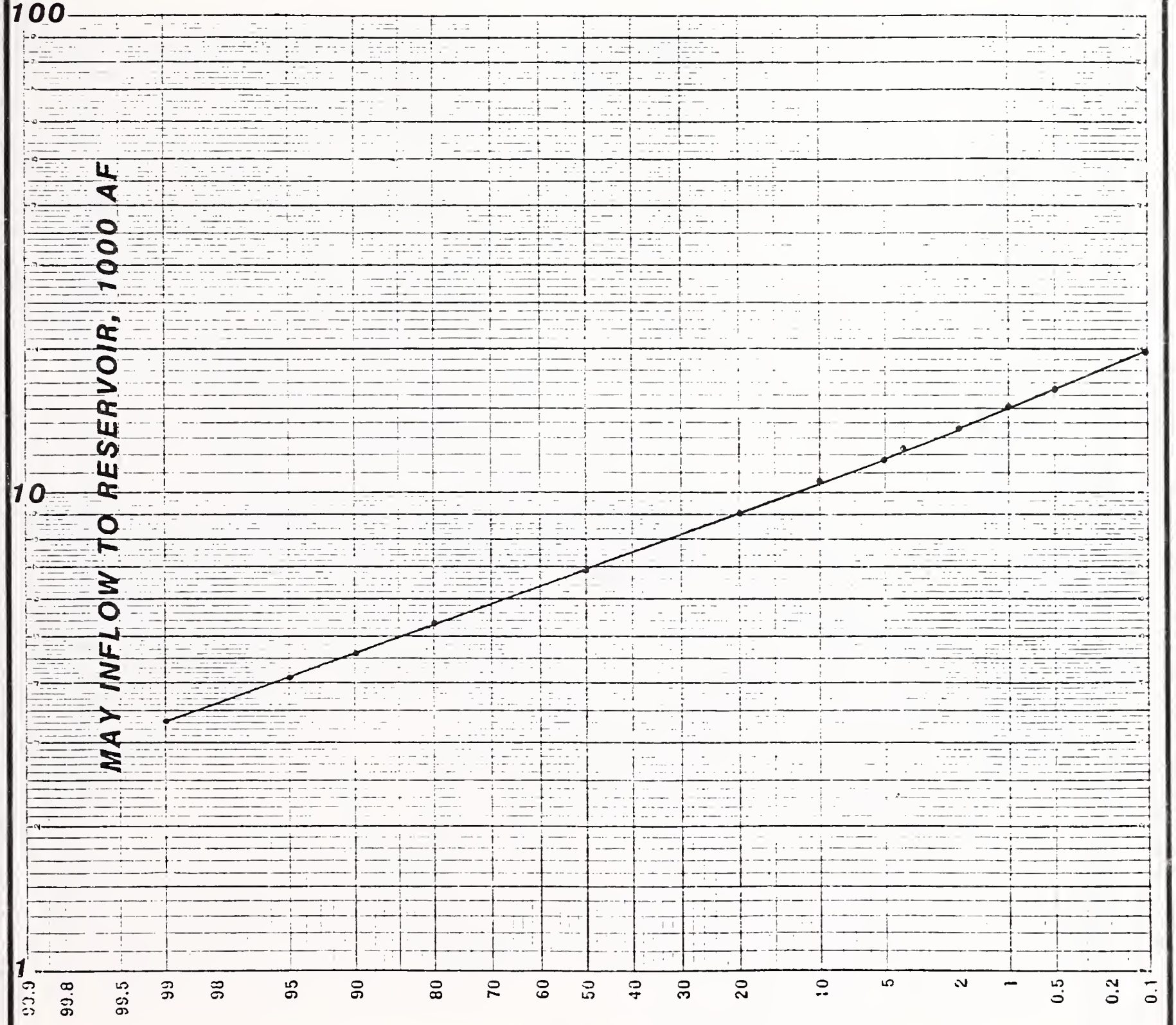
Results Of Hyalite Creek At Ranger Station Gage Transferred Upstream Using Drainage Area Ratio To Exponential Power.

MIDDLE CREEK DAM
PEAK DISCHARGE FREQUENCY CURVE
FOR RESERVOIR INFLOW

8M087.113 NOVEMBER 1983

FIGURE B2

HKM ASSOCIATES
ENGINEERS — PLANNERS



PERIOD OF RECORD: 1931 - 82

STUDY TECHNIQUE: Log - Pearson III

WEIGHTED SKEW = 0.12

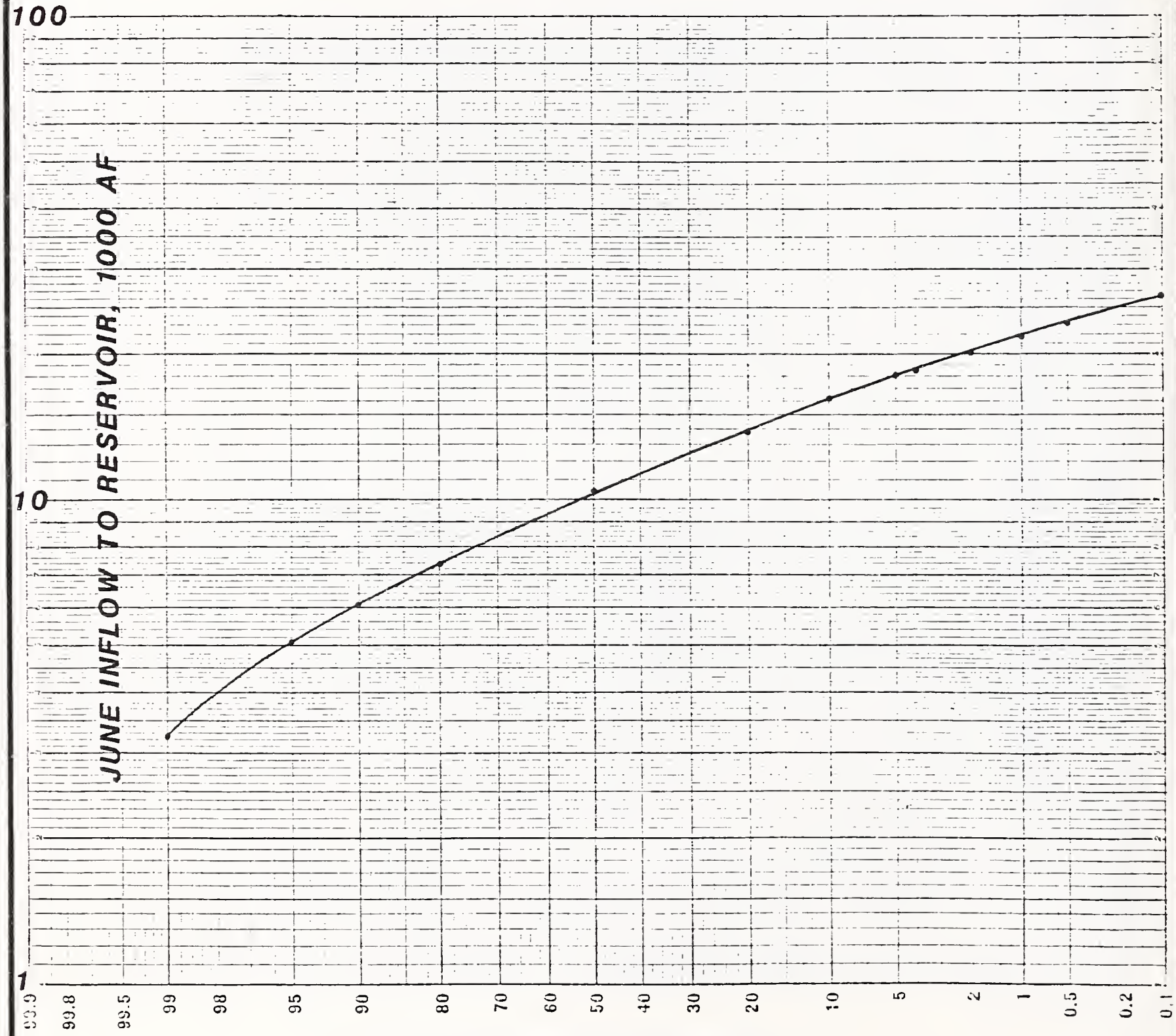
MIDDLE CREEK DAM

MAY INFLOW FREQUENCY CURVE

8M087.113 NOVEMBER 1983

FIGURE B3

HKM ASSOCIATES
ENGINEERS — PLANNERS



PERIOD OF RECORD: 1931 - 82

STUDY TECHNIQUE: Log - Pearson III

WEIGHTED SKEW = -0.43

MIDDLE CREEK DAM

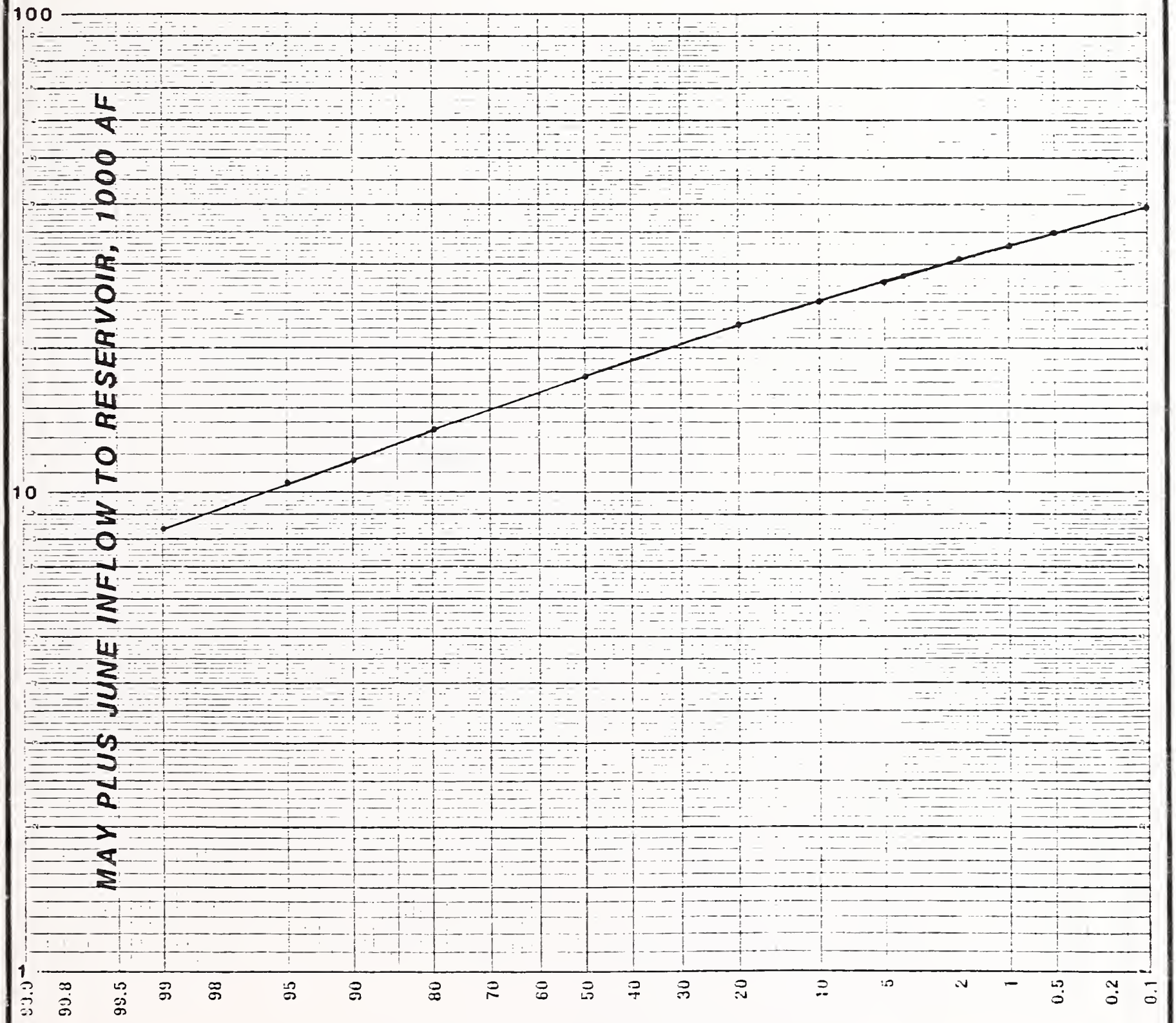
JUNE INFLOW FREQUENCY CURVE

8M087.113 NOVEMBER 1983

FIGURE B4

HKM ASSOCIATES

ENGINEERS — PLANNERS



PERIOD OF RECORD: 1931 - 82

STUDY TECHNIQUE: Log - Pearson III

WEIGHTED SKEW = -0.2

MIDDLE CREEK DAM
COMBINED MAY AND JUNE
INFLOW FREQUENCY CURVE

8M087.113 NOVEMBER 1983

FIGURE B5

HKM ASSOCIATES
ENGINEERS — PLANNERS

APPENDIX B - TABLES

Table B1

Streamgage Index

Gage Name	Gage Number	Drainage Area, sm	Period of Record[1/]
East Fork of Hyalite Creek	41H01000	8.4	1975 - present
West Fork of Hyalite Creek	41H01500	11.0	1966 - 74 [2/] 1975 - present
Hyalite Creek at Hyalite Ranger Station	06500000	48.2	1895 - 96, 1897, 1898 - 1900, 1902, 1903, 1904, 1934 - present
East Gallatin River at Bozeman	06048000	148	1939 - 61
Gallatin River near Gallatin Gateway	06043500	825	1889 - 94, 1930 - 69, 1971 - 81
Gallatin River at Logan	06052500	1795	1893 - 1905, 1928 - present

Notes:

1/ Given as water years. Present means 1982.

2/ Period when the SCS serviced the station.

8M087.1130/0550H

Table B2

MONTHLY STREAMFLOWS (DEREGULATED)

FILE -- HYUREGE3
SITE -- HYALITE CR. (MIDDLE CR. NEAR BOZEMAN) AT HYALITE RANGER STA.
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL
1889	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	2117	2163	*******
1890	2002	1933	1995	1620	1475	1620	2208	9967	12105	6637	3690	2873	48125
1891	2888	2415	2025	1995	1811	2231	2392	9051	11571	7317	3690	2766	50152
1892	2873	2392	2155	2132	2002	1995	2163	7103	20276	12029	4614	3453	63197
1893	3606	2789	2697	2315	1941	1880	2216	6760	17832	6217	3033	2781	54067
1894	2819	2201	1995	1666	1559	1575	2682	13861	18367	6637	3690	2873	59925
1895	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	3556	2975	*******
1896	3136	2737	2460	1845	1438	1537	1964	5903	17256	10084	2705	2380	53445
1897	2337	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1898	*******	*******	*******	*******	*******	*******	4844	10883	24159	13589	4562	4457	*******
1899	4564	3868	3689	3076	3055	4612	5355	9285	29982	20559	6383	3414	97820
1900	2987	*******	*******	*******	*******	*******	*******	*******	16066	5472	3382	2855	*******
1901	2951	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1902	*******	*******	*******	*******	*******	*******	*******	9039	15055	7133	4564	2499	*******
1903	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1904	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	2380	*******
1905	2590	2320	1840	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1906	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1907	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1908	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1909	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1910	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1911	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1912	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1913	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1914	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1915	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1916	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1917	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1918	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1919	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1920	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1921	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1922	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1923	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1924	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1925	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1926	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1927	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1928	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1929	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
1930	*******	*******	*******	*******	*******	*******	*******	*******	9661	4644	3079	2140	*******
1931	2537	1704	1521	1055	1468	1666	2399	6973	8134	2346	1506	1177	32436
1932	1231	1513	1433	1391	1330	1361	1712	9051	17451	5561	2453	1987	46524
1933	1842	1590	1368	1452	1239	1330	1849	4339	13938	4018	2331	1972	37258
1934	1595	1479	1478	1506	1322	1502	2725	4913	3040	1735	1381	964	23640
1935	1170	1010	708	599	637	764	1100	6590	13910	7230	2520	1470	37708
1936	1310	1100	1060	837	690	906	3900	7270	5280	1880	1530	1260	27023
1937	1300	1139	1030	891	696	873	1240	8460	9430	3280	1570	1430	31330
1938	1350	1040	861	899	742	980	2100	8170	10980	3980	2260	1520	34982

Table B2 (continued)

MONTHLY STREAMFLOWS (DEREGULATED)

FILE -- HYUREGE3
SITE -- HYALITE CR. (MIDDLE CR. NEAR BOZEMAN) AT HYALITE RANGER STA.
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

1939	1780	1460	1350	1170	833	1070	2570	8590	7770	4710	2080	1650	35033
1940	1470	1110	1020	1120	750	841	1870	10440	12020	4160	2070	1680	38551
1941	1610	1170	1070	1270	1060	1220	1900	6790	7370	2780	1820	3430	31490
1942	3260	2070	1900	1510	1010	1230	4050	7340	10830	8040	2740	1960	45940
1943	1830	1590	1270	1200	1160	1060	4050	7770	14190	8260	2820	1860	47060
1944	1830	1740	1260	1120	1100	1060	1300	8060	13970	7630	2750	2670	44490
1945	2300	1500	1170	1100	1100	1020	1230	8330	11990	9250	2780	2180	44000
1946	2080	1790	1610	1410	1410	1480	4630	6920	9200	5610	2950	2290	41430
1947	2060	1300	1370	1040	916	994	2230	12540	14230	9860	3760	3310	54410
1948	2780	1940	1860	1810	1060	1480	7290	17860	15830	6390	4590	3030	65920
1949	2510	2230	1840	1210	1250	920	3120	8710	9830	4180	2130	2170	40100
1950	2030	1510	1390	1120	1160	1160	1810	6090	12170	7680	3380	2330	41830
1951	2060	1310	1740	1500	992	653	3150	10450	6850	5260	2610	2080	39155
1952	2050	1360	1220	1570	1060	1120	3960	12460	14140	5850	2970	1980	49740
1953	1630	1251	1260	1165	1455	1099	1980	5650	13500	7570	2370	2000	40930
1954	1850	1480	1543	899	1295	1575	2060	7980	10620	6920	2940	1630	40692
1955	1340	1149	1631	1298	1021	1039	1231	8190	13420	6150	2630	1440	40539
1956	1720	1128	1373	1150	873	1159	2760	7070	11920	3290	1950	1860	36253
1957	1730	1392	1330	979	910	1155	1400	7320	15670	5660	2190	1950	41636
1958	1710	1350	1320	1290	1093	1121	2010	11900	9040	4490	2620	1790	39724
1959	1550	1470	1320	1270	935	1150	2360	9290	19830	8390	2940	2560	53665
1960	2640	2110	1570	1330	1310	1480	3490	7470	13820	5940	2910	1760	45830
1961	1530	1400	993	707	1014	1155	1810	6960	9450	2330	1750	1380	30979
1962	2780	1630	1280	1123	1099	1270	4840	9390	12160	7210	3690	2490	48962
1963	2200	1053	1860	1180	1307	1490	2740	11760	13930	5890	2960	2130	43500
1964	1800	1400	985	710	788	929	2770	11590	15720	10050	3760	2530	53032
1965	2280	1510	2140	1590	1310	1580	2380	10780	19430	13150	4240	3490	63380
1966	2701	2108	1671	1430	1293	1379	2440	11430	10600	5400	3120	1940	45512
1967	2050	1370	1563	1226	1041	1275	1510	10450	18100	10050	3040	2160	53835
1968	2540	2130	1840	1650	1360	1610	1930	11390	18680	13030	6230	4550	66940
1969	3980	2140	1600	1770	1221	1590	4710	17910	14760	10340	3400	2680	66101
1970	2430	1640	1690	1410	1480	1490	1330	17730	25240	11750	4450	3560	74250
1971	3080	2270	1560	1405	1580	1560	2130	12980	18590	11940	4620	3340	65055
1972	2930	1980	1376	1371	1342	2080	2530	9010	12840	5980	2080	2290	45709
1973	2310	1680	1280	972	967	1655	1268	13500	15350	7310	2670	2780	51752
1974	2190	2150	1450	1740	1174	1180	2990	10300	23390	10240	3470	2710	62934
1975	2200	1650	1250	1630	1470	1700	1320	5620	22010	17480	3840	3150	63320
1976	2980	2630	2130	1790	1650	1670	3260	15350	13970	9620	3650	2910	61610
1977	2790	1780	1500	1323	1272	1714	4110	8900	10420	3650	2240	2030	41729
1978	2970	1730	1630	1430	1310	1760	3820	11910	12230	9620	3360	3420	55190
1979	2560	2040	1500	1440	1190	1540	2230	9770	14110	6290	3150	2280	48150
1980	1620	1520	1310	1250	1150	1410	3830	11840	10080	4520	2230	1980	42790
1981	2110	1700	1490	1410	1074	1300	3100	15730	16070	6300	2430	2430	55144
1982	2270	1660	1910	1010	1240	1240	2230	9040	16050	10350	3770	3270	54090
MEAN	2272	1748	1563	1362	1228	1398	2632	9642	14062	7324	3058	2415	48339
S.D.	684	519	472	411	378	539	1217	3105	4878	3605	1015	731	12866
COEF. VAR.	.301	.296	.302	.301	.307	.385	.453	.322	.346	.492	.332	.302	.265
PERCENT OF ANNUAL MEAN	4.7%	3.6%	3.2%	2.8%	2.5%	2.9%	5.5%	19.8%	28.8%	15.0%	6.3%	5.0%	

SUM OF MONTHLY MEANS 48,757.5

Table B3

MONTHLY STREAMFLOWS (DEREGULATED)

FILE -- HYUREGE4
SITE -- HYALITE CR. (MIDDLE CR. NEAR BOZEMAN) AT HYALITE RANGER STA.
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ####### INDICATES NO DATA AVAILABLE

11/02/83

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL
1931	2537	1704	1521	1055	1463	1665	2399	6973	8134	2346	1506	1177	32486
1932	1231	1513	1483	1391	1330	1361	1712	9051	17451	5561	2453	1987	46524
1933	1842	1590	1368	1452	1239	1330	1849	4339	13938	4018	2331	1972	37268
1934	1595	1479	1478	1506	1322	1502	2725	4913	3040	1735	1381	964	23640
1935	1170	1010	708	599	637	764	1100	6590	13910	7230	2520	1470	37708
1936	1310	1100	1060	837	690	906	3900	7270	5280	1380	1530	1260	27023
1937	1300	1130	1030	891	696	873	1240	8460	9430	3280	1570	1430	31330
1938	1350	1040	861	899	742	980	2100	8170	10980	3980	2260	1520	34882
1939	1780	1460	1350	1170	833	1070	2570	8590	7770	4710	2080	1650	35033
1940	1470	1110	1020	1120	750	841	1870	10440	12020	4160	2070	1680	38551
1941	1610	1170	1070	1270	1060	1220	1900	6790	7370	2780	1820	3430	31490
1942	3260	2070	1900	1510	1010	1230	4050	7340	10830	8040	2740	1960	45940
1943	1830	1590	1270	1200	1160	1060	4050	7770	14190	8260	2820	1860	47060
1944	1830	1740	1260	1120	1100	1060	1300	8060	13970	7630	2750	2670	44490
1945	2300	1500	1170	1100	1100	1020	1280	8330	11990	9250	2780	2180	44000
1946	2080	1790	1610	1410	1410	1480	4680	6920	9200	5610	2950	2290	41430
1947	2060	1900	1370	1040	916	994	2280	12640	14280	9860	3760	3310	54410
1948	2780	1940	1860	1810	1060	1480	7290	17860	15830	6390	4590	3030	65920
1949	2510	2230	1840	1210	1250	920	3120	8710	9830	4180	2130	2170	40100
1950	2030	1510	1390	1120	1160	1160	1810	6090	12170	7680	3380	2330	41830
1951	2060	1810	1740	1500	992	653	3150	10450	6850	5260	2610	2080	39155
1952	2050	1360	1220	1570	1060	1120	3960	12460	14140	5850	2970	1980	49740
1953	1630	1251	1260	1165	1455	1099	1980	5650	13500	7570	2370	2000	40930
1954	1850	1480	1543	899	1295	1575	2060	7880	10620	6920	2940	1630	40692
1955	1340	1149	1631	1298	1021	1039	1231	8190	13420	6150	2630	1440	40539
1956	1720	1128	1373	1150	873	1159	2760	7070	11920	3290	1950	1860	36253
1957	1730	1392	1330	979	910	1155	1400	7320	15670	5660	2190	1950	41686
1958	1710	1350	1320	1290	1033	1121	2010	11900	9040	4490	2620	1790	39724
1959	1550	1470	1320	1270	935	1150	2360	9290	19830	8990	2940	2560	53665
1960	2640	2110	1570	1330	1310	1480	3490	7470	13820	5940	2910	1760	45830
1961	1530	1400	993	707	1014	1155	1810	6960	9450	2330	1750	1880	30979
1962	2780	1630	1280	1123	1099	1270	4840	9390	12160	7210	3690	2490	48962
1963	2200	1053	1860	1180	1307	1490	2740	11760	13930	5890	2960	2130	48500
1964	1800	1400	985	710	788	929	2770	11590	15720	10050	3760	2530	53032
1965	2280	1510	2140	1590	1310	1580	2380	10780	19430	13150	4240	3490	63880
1966	2701	2108	1671	1430	1293	1379	2440	11430	10600	5400	3120	1940	45512
1967	2050	1370	1563	1226	1041	1275	1510	10450	18100	10050	3040	2160	53835
1968	2540	2130	1840	1650	1360	1610	1930	11390	18680	13030	6230	4550	66940
1969	3980	2140	1600	1770	1221	1590	4710	17910	14760	10340	3400	2680	66101
1970	2430	1640	1690	1410	1480	1490	1380	17730	25240	11750	4450	3560	74250
1971	3080	2270	1560	1405	1580	1560	2130	12980	18590	11940	4620	3340	65055
1972	2930	1980	1376	1371	1342	2080	2530	9010	12840	5880	2080	2290	45709
1973	2310	1680	1280	972	941	1655	1268	13500	15360	7310	2670	2780	51752
1974	2190	2150	1450	1740	1174	1180	2930	10300	23390	10240	3470	2710	62934
1975	2200	1650	1250	1630	1470	1700	1320	5620	22010	17480	3840	3150	63320
1976	2930	2630	2130	1790	1650	1670	3260	15350	13970	9620	3650	2910	61610
1977	2730	1780	1500	1323	1272	1714	4110	8900	10420	3650	2240	2030	41729
1978	2970	1730	1630	1430	1310	1760	3820	11910	12230	9620	3360	3420	55190
1979	2560	2040	1500	1440	1190	1540	2280	9770	14110	6290	3150	2280	43150
1980	1620	1520	1310	1250	1150	1410	3880	11840	10080	4520	2230	1980	42730

Table B3 (continued)

MONTHLY STREAMFLOWS (DEREGULATED)

FILE -- HYUREGE4
SITE -- HYALITE CR. (MIDDLE CR. NEAR BOZEMAN) AT HYALITE RANGER STA.
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

1981	2110	1700	1490	1410	1074	1300	3100	15730	16070	6300	2430	2430	55144
1982	2270	1660	1910	1010	1240	1240	2280	9040	16050	10350	3770	3270	54090
MEAN	2124	1620	1441	1264	1138	1289	2636	9737	13338	6944	2878	2295	46708
S.D.	594	371	305	283	237	297	1205	3220	4376	3258	926	720	11374
COEF. VAR.	.279	.229	.212	.223	.208	.230	.457	.330	.328	.469	.321	.313	.243
PERCENT OF ANNUAL MEAN	4.5%	3.5%	3.1%	2.7%	2.4%	2.8%	5.6%	20.8%	28.6%	14.9%	6.2%	4.9%	

SUM OF MONTHLY MEANS 46,708.5

Table B4

MONTHLY STREAMFLOW (WITH SOME VALUES STATISTICALLY FILLED IN)

FILE -- HCFINAL
SITE -- MIDDLE CREEK DAM INFLOW
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL
1931	1801	1126	979	602	935	1096	1689	5388	6328	1646	967	700	23264
1932	744	972	948	873	825	849	1134	7069	13864	4247	1733	1355	34617
1933	1238	1035	855	923	750	825	1244	3259	11022	2998	1634	1343	27133
1934	1039	945	944	967	817	963	1953	3722	2207	1152	856	528	16109
1935	694	565	321	233	264	367	638	5079	11000	5596	1787	938	27439
1936	808	638	606	425	306	481	2903	5629	4019	1269	986	767	18845
1937	800	663	581	469	311	455	752	6592	7376	2402	1018	905	22329
1938	840	590	445	475	349	541	1447	6357	8629	2968	1577	978	25201
1939	1189	929	840	694	422	614	1827	6697	6033	3558	1431	1083	25323
1940	938	646	574	654	355	429	1262	8192	9471	3114	1423	1107	28171
1941	1051	694	614	776	606	736	1286	5241	5710	1997	1220	2522	22458
1942	2385	1423	1286	969	565	743	3025	5685	8509	6251	1965	1333	34146
1943	1229	1035	776	719	687	606	3025	6033	11226	6430	2029	1253	35054
1944	1229	1156	767	654	638	606	800	6268	11049	5920	1972	1908	32973
1945	1608	962	694	638	638	574	783	6486	9447	7231	1997	1512	32577
1946	1431	1196	1051	889	889	945	3534	5346	7190	4286	2134	1601	30496
1947	1415	1286	856	590	490	552	1593	9973	11299	7724	2790	2426	40999
1948	1997	1318	1253	1213	606	945	5645	14195	12553	4917	3461	2200	50307
1949	1779	1552	1237	727	760	492	2272	6794	7699	3130	1471	1504	29423
1950	1391	969	873	654	687	687	1213	4674	9592	5960	2482	1633	30821
1951	1415	1213	1156	962	551	277	2296	8201	5239	4003	1859	1431	29657
1952	1406	849	736	1018	606	654	2952	9827	11186	4480	2151	1350	37221
1953	1067	760	767	691	926	637	1350	4319	10668	5872	1666	1366	30093
1954	1244	945	996	475	795	1023	1415	6122	8338	5346	2127	1067	29900
1955	832	677	1058	798	574	589	744	6373	10603	4723	1876	913	29776
1956	1140	660	859	679	455	686	1991	5467	9390	2409	1326	1253	26310
1957	1148	875	825	540	435	682	881	5670	12423	4327	1520	1326	30706
1958	1131	840	816	792	625	655	1375	9374	7061	3380	1868	1196	29119
1959	1002	938	816	776	505	679	1657	7263	15788	7020	2127	1919	40334
1960	1883	1455	1018	825	808	945	2571	5791	10927	4554	2102	1173	34057
1961	986	981	552	321	569	682	1213	5379	7392	1633	1164	1269	22045
1962	1997	1067	733	657	637	776	3664	7344	9585	5591	2733	1763	36591
1963	1528	601	1253	703	805	954	1965	9261	11016	4512	2143	1471	36216
1964	1204	881	545	323	385	500	1939	9123	12464	7877	2790	1795	39832
1965	1593	969	1479	1035	808	1027	1674	8467	15464	10385	3178	2571	48656
1966	1933	1454	1100	905	734	864	1722	8993	8323	4117	2272	1318	33798
1967	1406	856	1013	741	591	780	969	8201	14389	7377	2207	1495	40532
1968	1803	1471	1237	1083	849	1051	1309	8961	14858	10283	4787	3429	51132
1969	2968	1479	1042	1180	736	1035	3558	14235	11688	8112	2498	1916	50453
1970	1714	1075	1115	889	945	954	865	14090	20164	9252	3347	2628	57045
1971	2240	1584	1011	885	1027	1011	1471	10248	14785	9406	3485	2451	49608
1972	2118	1350	861	857	834	1431	1795	7036	10135	4505	1431	1601	33960
1973	1617	1107	733	535	530	1087	775	10663	12172	5661	1908	1997	38845
1974	1520	1488	921	1155	698	703	2167	8079	18667	8032	2555	1941	47931
1975	1937	1844	1546	1442	1084	1108	1079	3894	17914	18717	3694	1972	56207
1976	2038	1506	1180	923	697	671	1311	8348	12693	9164	2919	1773	43229
1977	1797	994	802	703	520	407	1941	5561	10320	3115	1552	1521	29148
1978	1815	1167	884	820	778	839	1404	5196	11707	10367	2536	1831	39850
1979	1274	1145	982	1049	772	1013	1168	7009	12754	5990	1930	1683	36673
1980	2065	1824	1920	1461	901	793	2859	9054	9480	3504	1792	1915	37574

Table B4 (Continued)

MONTHLY STREAMFLOW (WITH SOME VALUES STATISTICALLY FILLED IN)

FILE -- MCFINAL
SITE -- MIDDLE CREEK DAM INFLOW
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ####### INDICATES NO DATA AVAILABLE

11/02/83

1981	1373	1217	1124	923	584	698	1556	7569	11719	5293	1722	1196	34980
1982	1324	1014	853	1285	1074	1065	1151	5233	11877	9565	2903	2245	39535
MEAN	1462	1075	934	800	670	765	1736	7289	10682	5620	2098	1582	34768
S.D.	472	320	284	265	199	234	952	2469	3528	3128	779	558	3349
COEF. VAR.	.323	.297	.304	.331	.298	.306	.533	.338	.330	.556	.371	.352	.268
PERCENT OF ANNUAL MEAN	4.2%	3.1%	2.7%	2.3%	1.9%	2.2%	5.1%	21.0%	30.7%	16.2%	6.0%	4.6%	

SUM OF MONTHLY MEANS 34,768.1

EAST FORK OF HYALITE CREEK

DAILY AND MONTHLY STREAMFLOWS

Table B5

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H J1000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1975

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	6.0	4.5	4.5	3.0	4.5	45	105	34	10	8.0	10	6.0
2	6.0	4.5	4.5	3.0	4.5	67	128	29	10	8.0	10	6.0
3	6.0	4.5	4.5	3.0	6.0	115	155	29	10	8.0	10	5.0
4	6.0	4.5	4.5	3.0	4.5	105	135	24	10	9.0	10	5.0
5	6.0	4.5	4.5	3.0	4.5	95	185	20	10	8.0	8.0	5.0
6	6.0	4.5	3.0	3.0	4.5	128	185	20	10	6.0	8.0	5.0
7	6.0	4.5	4.5	3.0	4.5	155	185	20	10	8.0	8.0	5.0
8	6.0	4.5	4.5	3.0	6.0	140	170	20	10	8.0	8.0	5.0
9	6.0	4.5	4.5	3.0	4.5	95	155	16	10	8.0	8.0	5.0
10	6.0	4.5	4.5	3.0	6.0	67	128	16	10	8.0	8.0	5.0
11	4.5	4.5	3.0	3.0	6.0	67	115	16	10	8.0	8.0	5.0
12	6.0	4.5	4.5	3.0	8.0	75	95	13	10	8.0	6.0	5.0
13	6.0	4.5	4.5	4.5	10	95	95	13	8.0	8.0	6.0	5.0
14	4.5	4.5	3.0	4.5	13	140	85	16	8.0	8.0	6.0	5.0
15	4.5	4.5	3.0	4.5	29	155	95	13	8.0	8.0	6.0	5.0
16	4.5	4.5	3.0	4.5	45	155	85	16	8.0	8.0	6.0	5.0
17	6.0	4.5	3.0	4.5	59	115	67	13	10	8.0	6.0	5.0
18	6.0	4.5	3.0	4.5	59	95	59	16	10	10	6.0	5.0
19	6.0	4.5	3.0	4.5	52	85	52	13	10	10	6.0	5.0
20	6.0	4.5	3.0	4.5	40	85	45	13	10	10	6.0	5.0
21	6.0	4.5	3.0	4.5	29	85	40	13	10	16	6.0	5.0
22	6.0	4.5	4.5	4.5	24	95	40	13	10	20	6.0	5.0
23	4.5	4.5	4.5	4.5	20	115	34	13	10	16	6.0	5.0
24	4.5	4.5	4.5	4.5	16	200	34	13	8.0	13	6.0	5.0
25	4.5	4.5	3.0	4.5	13	185	34	10	8.0	13	6.0	5.0
26	4.5	4.5	4.5	4.5	13	140	29	10	8.0	13	6.0	5.0
27	4.5	4.5	4.5	4.5	13	105	34	10	8.0	10	6.0	5.0
28	4.5	4.5	4.5	4.5	13	75	29	10	8.0	10	6.0	5.0
29	4.5	------	3.0	4.5	16	75	29	10	8.0	10	6.0	5.0
30	4.5	------	3.0	4.5	24	85	34	10	8.0	10	6.0	5.0
31	4.5	------	3.0	------	34	------	40	10	------	10	------	5.0
TOTAL	166.5	126.0	118.5	117.0	585.5	3,239	2,751	492	278.0	305.0	210.0	157.0
MEAN	5.37	4.50	3.82	3.90	18.9	108	83.7	15.9	9.27	9.84	7.00	5.06
MAX	6.0	4.5	4.5	4.5	59	200	185	34	10	20	10	6.0
MIN	4.5	4.5	3.0	3.0	4.5	45	29	10	8.0	6.0	6.0	5.0
AC-FT	330	250	235	232	1,160	6,420	5,460	976	551	605	417	311

CAL YR 1975 TOTAL 8,545.5 MEAN 23.4 MAX 200 MIN 3.0 AC-FT 16,950

Table B6

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1976

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.5	1.0	1.0	1.0	4.0	53	71	18	9.0	6.5	6.5	2.0
2	4.5	1.0	1.0	1.0	6.5	58	71	18	9.0	6.5	6.5	2.0
3	4.5	4.0	1.0	1.0	12	65	65	18	9.0	9.0	6.5	2.0
4	4.5	2.0	1.0	2.0	18	71	58	18	9.0	9.0	6.5	2.0
5	4.5	2.0	1.0	4.0	18	79	58	18	9.0	9.0	4.0	2.0
6	4.5	1.0	1.0	4.0	18	79	58	15	9.0	9.0	4.0	2.0
7	4.5	1.0	1.0	6.5	18	87	58	15	12	9.0	4.0	2.0
8	4.5	1.0	1.0	9.0	25	87	58	15	9.0	9.0	4.0	2.0
9	4.5	1.0	1.0	12	33	87	53	15	9.0	9.0	4.0	2.0
10	4.5	1.0	1.0	9.0	37	87	47	15	9.0	9.0	6.5	2.0
11	4.5	1.0	1.0	12	42	79	42	15	9.0	9.0	4.0	2.0
12	4.5	1.0	1.0	15	37	65	47	15	9.0	9.0	2.0	2.0
13	4.5	1.0	1.0	15	37	65	42	15	9.0	9.0	2.0	2.0
14	3.0	1.0	1.0	12	42	53	37	15	9.0	9.0	2.0	2.0
15	3.0	1.0	1.0	12	47	47	33	12	9.0	6.5	4.0	2.0
16	4.5	1.0	1.0	9.0	37	53	33	12	9.0	6.5	2.0	2.0
17	3.0	1.0	1.0	9.0	42	65	29	12	9.0	6.5	2.0	2.0
18	4.5	1.0	1.0	6.5	53	65	33	12	9.0	6.5	2.0	2.0
19	3.0	1.0	1.0	6.5	53	65	33	12	9.0	6.5	2.0	2.0
20	3.0	1.0	1.0	4.0	58	79	29	12	9.0	6.5	2.0	2.0
21	3.0	1.0	1.0	4.0	58	87	29	12	6.5	6.5	2.0	2.0
22	3.0	1.0	1.0	4.0	58	87	25	12	9.0	6.5	2.0	2.0
23	3.0	1.0	1.0	4.0	58	79	25	12	9.0	6.5	2.0	2.0
24	3.0	1.0	1.0	4.0	53	65	21	12	9.0	6.5	2.0	2.0
25	3.0	1.0	1.0	4.0	47	58	21	9.0	9.0	6.5	2.0	1.0
26	1.0	1.0	1.0	4.0	42	47	21	9.0	9.0	6.5	2.0	1.0
27	1.0	1.0	1.0	4.0	47	42	18	9.0	6.5	6.5	2.0	1.0
28	1.0	1.0	1.0	4.0	53	42	18	9.0	6.5	6.5	2.0	1.0
29	1.0	1.0	1.0	4.0	58	47	18	9.0	6.5	6.5	2.0	1.0
30	1.0	------	1.0	4.0	53	58	18	9.0	6.5	6.5	2.0	1.0
31	1.0	------	1.0	------	53	------	18	9.0	------	6.5	------	1.0
TOTAL	103.5	34.0	31.0	190.5	1,217.5	2,001	1,187	408.0	260.5	231.5	96.5	55.0
MEAN	3.34	1.17	1.00	6.35	39.3	66.7	38.3	13.2	8.68	7.47	3.22	1.77
MAX	4.5	4.0	1.0	15	58	87	71	18	12	9.0	6.5	2.0
MIN	1.0	1.0	1.0	1.0	4.0	42	18	9.0	6.5	6.5	2.0	1.0
AC-FT	205	67	61	378	2,410	3,970	2,350	809	517	459	191	109

CAL YR 1976 TOTAL 5,816.0 MEAN 15.9 MAX 87 MIN 1.0 AC-FT 11,540

Table B7

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1977

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.0	1.0	1.0	1.0	33	25	25	9.0	9.0	9.0	9.0	5.0
2	1.0	1.0	1.0	1.0	33	47	25	9.0	9.0	9.0	9.0	5.0
3	1.0	1.0	1.0	1.0	33	47	25	9.0	9.0	12	9.0	5.0
4	1.0	1.0	1.0	1.0	25	65	33	9.0	9.0	12	7.0	5.0
5	1.0	1.0	1.0	1.0	25	72	29	9.0	9.0	12	7.0	5.0
6	1.0	1.0	1.0	1.0	18	80	25	9.0	9.0	9.0	7.0	5.0
7	1.0	1.0	1.0	3.0	18	72	22	9.0	9.0	12	7.0	5.0
8	1.0	1.0	1.0	5.0	18	80	22	9.0	7.0	12	7.0	5.0
9	1.0	1.0	1.0	7.0	22	72	18	9.0	7.0	9.0	7.0	5.0
10	1.0	1.0	1.0	7.0	29	72	18	7.0	7.0	9.0	7.0	5.0
11	1.0	1.0	1.0	7.0	33	65	18	7.0	7.0	12	7.0	5.0
12	1.0	1.0	1.0	7.0	29	59	18	9.0	7.0	12	7.0	5.0
13	1.0	1.0	1.0	7.0	29	59	15	9.0	7.0	12	7.0	5.0
14	1.0	1.0	1.0	7.0	33	59	15	9.0	7.0	12	7.0	5.0
15	1.0	1.0	0	7.0	33	53	15	9.0	9.0	12	7.0	5.0
16	1.0	1.0	1.0	7.0	33	53	15	9.0	9.0	12	7.0	5.0
17	1.0	1.0	1.0	9.0	25	53	15	7.0	9.0	12	7.0	5.0
18	1.0	1.0	1.0	9.0	25	47	15	7.0	9.0	12	7.0	5.0
19	1.0	1.0	1.0	7.0	22	42	15	7.0	7.0	12	7.0	5.0
20	1.0	1.0	1.0	7.0	22	42	15	7.0	7.0	12	5.0	5.0
21	1.0	1.0	1.0	7.0	18	42	12	7.0	9.0	12	5.0	5.0
22	1.0	1.0	1.0	7.0	18	37	12	7.0	9.0	9.0	7.0	5.0
23	1.0	1.0	1.0	12	22	37	12	7.0	9.0	9.0	7.0	5.0
24	1.0	1.0	1.0	18	25	37	12	7.0	9.0	9.0	7.0	5.0
25	0	1.0	1.0	25	25	33	12	7.0	9.0	9.0	5.0	5.0
26	0	1.0	1.0	25	29	33	12	9.0	9.0	9.0	7.0	5.0
27	1.0	1.0	1.0	25	29	29	12	9.0	9.0	9.0	7.0	5.0
28	1.0	1.0	1.0	25	25	29	12	9.0	9.0	9.0	7.0	5.0
29	1.0	------	1.0	25	25	25	12	9.0	9.0	9.0	7.0	5.0
30	1.0	------	1.0	29	25	22	9.0	9.0	9.0	9.0	7.0	5.0
31	1.0	------	1.0	------	25	------	9.0	9.0	------	9.0	------	5.0
TOTAL	29.0	28.0	30.0	300.0	804	1,488	524.0	257.0	252.0	327.0	210.0	155.0
MEAN	.94	1.00	.97	10.0	25.9	49.6	16.9	8.29	8.40	10.5	7.00	5.00
MAX	1.0	1.0	1.0	29	33	80	33	9.0	9.0	12	9.0	5.0
MIN	0	1.0	0	1.0	18	22	9.0	7.0	7.0	9.0	5.0	5.0
AC-FT	58	56	60	595	1,590	2,950	1,040	510	500	649	417	307

CAL YR 1977 TOTAL 4,404.0 MEAN 12.0 MAX 80 MIN 0 AC-FT 8,740

Table B8

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1978

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.0	4.3	4.3	14	14	29	64	19	7.5	9.5	5.8	4.3
2	5.0	4.3	4.3	12	14	25	58	19	7.5	9.5	5.8	4.3
3	5.0	4.3	4.3	12	14	29	58	16	7.5	9.5	5.8	4.3
4	3.0	4.3	3.0	9.5	14	33	58	14	7.5	7.5	5.8	4.3
5	3.0	4.3	3.0	7.5	14	52	58	14	7.5	7.5	5.8	4.3
6	3.0	4.3	3.0	7.5	12	64	52	14	7.5	7.5	5.8	4.3
7	3.0	4.3	3.0	7.5	12	71	47	14	7.5	7.5	4.3	4.3
8	3.0	4.3	3.0	7.5	9.5	79	52	14	7.5	7.5	5.8	4.3
9	3.0	4.3	3.0	7.5	9.5	88	58	12	7.5	7.5	4.3	4.3
10	3.0	4.3	3.0	7.5	12	99	58	12	7.5	7.5	3.0	4.3
11	3.0	4.3	3.0	7.5	14	79	58	12	7.5	7.5	4.3	4.3
12	3.0	4.3	3.0	5.8	14	58	52	12	7.5	7.5	4.3	4.3
13	3.0	4.3	3.0	5.8	14	64	47	12	7.5	5.8	4.3	4.3
14	3.0	4.3	3.0	5.8	19	79	47	12	9.5	7.5	4.3	4.3
15	3.0	4.3	3.0	5.8	42	79	47	12	9.5	5.8	4.3	4.3
16	3.0	4.3	3.0	7.5	52	71	47	12	12	5.8	4.3	3.0
17	3.0	4.3	3.0	7.5	37	64	47	12	9.5	5.8	4.3	3.0
18	4.3	4.3	3.0	7.5	29	58	42	9.5	9.5	5.8	4.3	3.0
19	4.3	4.3	3.0	7.5	22	64	37	9.5	9.5	5.8	4.3	3.0
20	4.3	4.3	3.0	7.5	22	58	37	9.5	9.5	5.8	4.3	3.0
21	4.3	4.3	3.0	7.5	29	58	33	9.5	9.5	5.8	4.3	3.0
22	4.3	4.3	4.3	7.5	42	64	33	7.5	12	5.8	4.3	3.0
23	4.3	4.3	4.3	7.5	52	64	25	7.5	12	5.8	4.3	3.0
24	4.3	4.3	4.3	7.5	58	71	25	7.5	12	5.8	4.3	3.0
25	4.3	4.3	4.3	7.5	52	64	25	7.5	12	5.8	4.3	3.0
26	4.3	4.3	4.3	12	37	58	25	7.5	12	5.8	4.3	3.0
27	4.3	4.3	4.3	12	37	52	22	7.5	12	5.8	4.3	3.0
28	4.3	4.3	5.8	14	33	52	22	7.5	12	5.8	4.3	3.0
29	4.3	------	7.5	14	37	64	22	7.5	9.5	5.8	4.3	4.3
30	4.3	------	9.5	14	33	64	22	7.5	9.5	5.8	------	4.3
31	4.3	------	12	------	29	------	19	7.5	------	5.8	------	------
TOTAL	115.2	120.4	127.5	264.2	829.0	1,854	1,297	345.0	279.0	207.9	133.2	115.1
MEAN	3.72	4.30	4.11	8.81	26.7	61.8	41.8	11.1	9.30	6.71	4.61	3.71
MAX	5.0	4.3	12	14	58	99	64	19	12	9.5	5.8	4.3
MIN	3.0	4.3	3.0	5.8	9.5	25	19	7.5	7.5	5.8	3.0	3.0
AC-FT	229	239	253	524	1,640	3,680	2,570	684	553	412	274	228

CAL YR 1978 TOTAL 5,692.5 MEAN 15.6 MAX 99 MIN 3.0 AC-FT 11,290

Table B9

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.3	4.3	3.0	4.3	14	42	58	14	9.5	12	5.8	5.8
2	4.3	4.3	4.3	5.8	14	42	52	14	9.5	12	4.3	5.8
3	4.3	4.3	3.0	5.8	14	47	47	14	9.5	9.5	5.8	5.8
4	4.3	4.3	3.0	5.8	16	52	47	12	9.5	9.5	5.8	5.8
5	4.3	4.3	3.0	5.8	19	64	42	12	9.5	9.5	5.8	5.8
6	4.3	4.3	4.3	5.8	22	71	37	12	9.5	9.5	5.8	5.8
7	4.3	4.3	4.3	5.8	19	58	37	12	9.5	9.5	5.8	5.8
8	4.3	4.3	3.0	5.8	16	47	33	12	9.5	9.5	5.8	5.8
9	4.3	4.3	3.0	5.8	16	37	33	12	9.5	9.5	5.8	5.8
10	4.3	4.3	3.0	5.8	14	37	33	12	12	9.5	5.8	5.8
11	4.3	4.3	3.0	5.8	14	37	29	12	12	9.5	5.8	5.8
12	4.3	4.3	4.3	5.8	12	47	29	12	12	9.5	5.8	5.8
13	4.3	4.3	5.8	5.8	14	64	29	12	12	9.5	5.8	5.8
14	4.3	4.3	5.8	5.8	16	71	25	12	12	9.5	5.8	5.8
15	4.3	4.3	5.8	5.8	22	64	22	12	12	7.5	5.8	5.8
16	4.3	4.3	5.8	5.8	29	58	19	12	9.5	7.5	5.8	5.8
17	4.3	4.3	5.8	5.8	37	58	19	12	9.5	7.5	5.8	5.8
18	4.3	4.3	5.8	7.5	33	58	19	12	9.5	7.5	7.5	5.8
19	4.3	4.3	5.8	7.5	37	64	19	12	9.5	7.5	7.5	5.8
20	4.3	4.3	5.8	7.5	37	79	19	12	12	7.5	7.5	5.8
21	4.3	4.3	5.8	7.5	47	88	19	12	12	7.5	5.8	5.8
22	4.3	4.3	4.3	7.5	52	79	19	12	12	7.5	7.5	5.8
23	4.3	4.3	4.3	7.5	58	71	22	12	12	7.5	7.5	5.8
24	4.3	4.3	4.3	7.5	64	64	19	12	12	7.5	7.5	5.8
25	4.3	3.0	4.3	7.5	71	64	19	12	12	7.5	7.5	5.8
26	4.3	3.0	4.3	7.5	79	71	16	12	12	7.5	7.5	5.8
27	4.3	3.0	4.3	7.5	88	71	16	12	12	5.8	5.8	5.8
28	4.3	3.0	4.3	9.5	79	64	16	12	12	5.8	5.8	5.8
29	4.3	------	4.3	9.5	64	64	16	12	12	5.8	5.8	4.3
30	4.3	------	4.3	12	52	64	14	12	12	5.8	5.8	4.3
31	4.3	------	4.3	------	42	------	14	12	------	4.3	------	4.3
TOTAL	133.3	115.2	136.4	203.1	1,111	1,797	838	378	327.5	255.5	186.1	175.3
MEAN	4.30	4.11	4.40	6.77	35.8	59.9	27.0	12.2	10.9	8.24	6.20	5.65
MAX	4.3	4.3	5.8	12	88	88	58	14	12	12	7.5	5.8
MIN	4.3	3.0	3.0	4.3	12	37	14	12	9.5	4.3	4.3	4.3
AC-FT	264	229	271	403	2,200	3,560	1,660	750	650	507	369	348

CAL YR 1979 TOTAL 5,656.4 MEAN 15.5 MAX 88 MIN 3.0 AC-FT 11,220

Table B10

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE Ab RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1980

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.4	2.0	3.8	2.8	31	37	30	9.5	9.1	7.3	5.3	5.8
2	5.0	2.0	3.6	2.8	32	37	29	9.5	3.8	6.9	5.8	5.8
3	5.0	3.0	3.6	2.6	33	36	31	9.5	6.4	6.5	5.8	5.8
4	5.0	3.0	3.6	2.8	34	33	29	9.9	3.0	6.1	6.1	5.8
5	4.4	3.0	3.3	2.6	36	30	27	9.5	8.0	5.8	6.5	5.8
6	3.0	3.0	3.3	2.6	42	30	25	9.1	8.0	6.1	6.5	5.8
7	4.4	3.8	3.3	3.0	50	29	24	8.8	8.0	6.1	7.6	5.5
8	5.5	3.8	3.0	3.3	50	29	24	8.4	6.4	5.8	8.0	5.2
9	5.5	3.8	3.0	3.3	48	33	23	8.0	6.4	5.8	7.6	5.5
10	5.5	3.8	3.0	3.3	44	38	22	8.0	6.4	5.8	7.6	5.5
11	5.8	3.8	2.8	3.6	36	47	21	8.0	13	5.5	7.6	5.2
12	5.5	4.1	2.8	3.3	31	54	20	8.4	16	5.8	6.9	5.2
13	5.2	4.1	2.8	3.6	21	58	21	9.5	15	5.8	5.3	5.2
14	5.2	4.4	2.8	4.4	25	55	19	8.8	13	5.8	4.4	5.5
15	5.2	4.4	2.8	5.0	25	54	19	9.5	12	5.5	4.4	5.8
16	5.2	4.4	3.0	5.0	27	52	16	9.5	11	5.2	3.8	6.1
17	5.2	4.4	2.8	5.2	30	54	16	8.4	10	5.5	5.0	6.5
18	5.2	4.4	2.3	6.1	33	58	13	8.4	9.9	5.5	5.8	6.5
19	4.4	4.4	2.6	8.8	35	64	9.9	9.5	9.1	5.2	5.8	6.1
20	3.0	4.4	2.4	15	43	66	9.5	8.8	8.8	5.2	5.8	6.5
21	5.2	4.4	2.4	21	60	67	9.5	8.0	8.8	5.8	5.8	6.5
22	5.2	4.4	2.2	26	69	64	9.5	8.4	8.8	5.0	5.8	6.5
23	5.2	4.4	2.0	31	75	59	9.1	8.4	8.4	4.7	5.5	6.5
24	5.2	4.4	2.0	33	72	50	9.1	8.8	8.4	5.8	5.5	6.5
25	5.2	4.1	2.4	35	64	47	9.5	8.4	8.4	6.5	5.5	6.5
26	3.0	4.1	2.4	34	52	45	9.5	8.4	8.0	6.5	5.2	6.5
27	2.0	4.4	2.2	32	42	42	9.5	8.8	7.6	6.1	5.5	6.9
28	2.0	4.1	2.2	31	37	36	9.5	9.1	7.6	5.8	5.5	6.5
29	1.0	4.1	2.4	33	37	33	9.5	8.8	7.6	5.8	5.3	6.5
30	1.0	------	2.2	33	37	33	9.5	8.8	7.3	5.3	5.2	6.5
31	2.0	------	2.6	------	38	------	9.5	8.8	------	5.8	------	6.5
TOTAL	134.6	112.4	86.1	398.1	1,289	1,370	532.1	273.7	274.2	180.8	178.5	187.0
MEAN	4.34	3.88	2.78	13.3	41.6	45.7	17.2	8.83	9.14	5.83	5.95	6.03
MAX	5.8	4.4	3.8	35	75	67	31	9.9	16	7.3	8.0	6.9
MIN	1.0	2.0	2.0	2.6	21	29	9.1	8.0	6.4	4.7	3.8	5.2
AC-FT	267	223	171	790	2,560	2,720	1,060	543	544	359	354	371

CAL YR 1980 TOTAL 5,016.5 MEAN 13.7 MAX 75 MIN 1.0 AC-FT 9,950

Table B11

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

EAST FORK HYALITE CR 1 MILE AB RESERVOIR NUMBER 41H 01000

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1981

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	6.5	2.8	1.0	2.6	29	62	55	13	7.6	6.9	6.1	4.7
2	6.5	2.8	1.2	2.6	33	55	53	13	7.6	5.9	6.1	4.7
3	5.8	2.6	1.2	2.4	29	53	48	12	7.6	7.6	5.8	4.4
4	6.1	2.6	1.2	2.4	23	50	45	12	7.3	7.6	5.8	4.4
5	6.1	2.4	1.4	2.4	21	52	43	12	6.9	7.6	5.8	4.4
6	5.8	2.4	1.4	2.2	21	70	42	12	6.9	7.6	5.8	4.4
7	5.8	2.2	1.6	2.6	19	79	41	12	6.5	8.4	5.8	4.4
8	5.8	2.2	1.6	2.4	17	89	36	12	6.1	8.8	5.8	4.4
9	5.8	2.2	1.6	2.4	15	83	33	12	6.1	8.0	5.5	4.4
10	5.8	2.0	1.6	2.4	15	64	30	12	6.1	7.6	5.2	4.4
11	5.8	2.0	1.6	2.4	15	58	29	12	6.1	8.0	5.5	4.4
12	5.5	1.8	2.0	2.2	14	58	28	11	6.1	7.6	5.2	4.4
13	5.5	1.8	2.0	2.6	14	62	27	11	6.1	7.3	5.2	4.4
14	5.2	1.6	2.0	2.4	13	53	25	11	6.1	7.3	5.0	4.4
15	5.2	1.6	2.0	3.0	14	47	24	11	5.8	6.9	4.7	4.4
16	5.0	1.4	2.2	4.1	17	48	23	10	5.8	7.3	5.0	4.4
17	5.0	1.4	2.4	5.5	17	58	23	9.5	5.8	7.3	5.0	4.4
18	4.7	1.2	2.4	8.0	20	54	22	9.1	5.8	6.9	5.0	4.4
19	4.7	1.2	2.2	11	28	57	21	8.3	5.8	6.9	4.4	4.4
20	4.4	1.0	2.2	12	39	60	20	8.4	6.1	6.9	5.0	4.4
21	4.4	1.0	2.2	12	48	59	17	9.5	5.8	6.1	5.0	4.4
22	4.1	.80	2.2	11	73	59	16	9.5	5.8	5.5	5.0	4.4
23	4.1	.60	2.2	11	83	63	16	8.4	5.8	5.8	4.7	4.4
24	3.8	.40	2.0	15	76	62	16	8.4	5.8	6.1	5.0	4.4
25	3.8	.40	2.0	19	78	62	15	8.4	6.5	6.1	4.7	4.4
26	3.6	.40	2.2	18	91	64	15	8.0	6.5	6.1	4.1	4.4
27	3.6	.60	2.2	18	85	64	14	8.0	6.9	6.5	4.4	4.4
28	3.3	.80	2.2	17	76	60	14	7.6	6.5	6.5	4.4	4.4
29	3.3	------	2.4	19	72	53	14	7.6	7.6	6.5	4.7	4.4
30	3.0	------	2.4	23	69	52	14	7.6	7.6	6.5	4.7	4.4
31	3.0	------	2.6	------	67	------	13	7.6	------	6.5	------	4.1
TOTAL	151.0	44.20	59.4	240.6	1,231	1,810	832	314.4	193.0	217.6	154.4	136.7
MEAN	4.87	1.58	1.92	8.02	39.7	60.3	26.8	10.1	6.43	7.02	5.15	4.41
MAX	6.5	2.8	2.6	23	91	89	55	13	7.6	8.8	6.1	4.7
MIN	3.0	.40	1.0	2.2	13	47	13	7.6	5.8	5.5	4.1	4.1
AC-FT	300	88	118	477	2,440	3,590	1,650	624	383	432	306	271

CAL YR 1981 TOTAL 5,384.30 MEAN 14.7 MAX 91 MIN .40 AC-FT 10,680

Table B12

Peak 6-29-82
6H = 1.75 ft
16.30 hrs.
136 cfs.

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

WATER RESOURCES DIVISION

STATION NUMBER 2LH-02000

DAILY DISCHARGE IN SECOND FEET FOR East Fork Hyalite Creek Lake Reservoir

YEAR ENDING DECEMBER 31, 19 82 TOTAL DISCHARGE IN ACRE FEET 16,850

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	4.40	3.60	2.60	3.80	12.00	24.00	123.00	20.00	14.00	16.00	13.00	8.40	1
2	4.10	3.60			18.	22.	101.	19.	13.	16.	13.	8.20	2
3	4.40	3.30			27.	23.	89.	19.	13.	16.	12.	8.40	3
4		3.00			29.	25.	78.	19.	13.	17.	13.	8.40	4
5		2.60			23.	27.	69.	18.	13.	17.	12.	8.40	5
6					18.	30.	58.	17.	13.	17.	12.	8.40	6
7					16.	30.	53.	16.	12.	17.	10.00	7.60	7
8	4.40				15.	29.	55.	16.	12.	17.	9.90	6.70	8
9	4.10				14.	27.	62.	16.	12.	16.	10.00	8.40	9
10	4.10				13.	27.	60.	17.	14.	15.	9.90	8.00	10
11	4.10				12.	29.	58.	16.	14.	15.	9.90	7.60	11
12	4.40			3.80	12.	33.	54.	16.	14.	15.	9.10	7.60	12
13	4.40			4.10	11.	49.	53.	15.	15.	16.	9.50	7.60	13
14	4.40			4.10	11.	58.	54.	15.	15.	16.	9.50	7.60	14
15	3.80			4.10	13.	57.	53.	15.	15.	17.	9.50	7.60	15
16	3.80			4.40	16.	62.	47.	14.	15.	17.	9.50	7.60	16
17	4.40				21.	67.	40.	14.	15.	17.	9.50	7.60	17
18	4.10				27.	70.	37.	15.	15.	17.	9.50	7.60	18
19	4.10				33.	66.	37.	14.	15.	16.	9.50	7.60	19
20	4.10				39.	69.	35.	14.	15.	15.	9.10	7.60	20
21	3.80		2.60		26.	73.	33.	13.	15.	15.	9.10	7.60	21
22	4.10		3.80		29.	79.	32.	14.	15.	15.	8.80	7.60	22
23	4.10			4.40	37.	85.	30.	13.	14.	15.	8.40	7.60	23
24	3.80			4.70	40.	85.	30.	12.	14.	14.	8.20	7.60	24
25	3.80			6.50	42.	83.	28.	12.	14.	14.	7.60	6.90	25
26	3.60			8.00	40.	92.	27.	13.	15.	14.	7.50	7.60	26
27	3.80			8.30	55.	95.	25.	13.	17.	14.	7.60	7.30	27
28	3.80	2.60		7.90	49.	113.	24.	13.	18.	14.	8.00	7.30	28
29	3.80			11.00	39.	131.	22.	14.	17.	14.	8.00	7.00	29
30	3.60			11.00	30.	131.00	21.	15.	17.00	14.	7.40	7.30	30
31	3.60		3.80		27.00		21.00	15.00		14.00		7.30	31
TOTAL	126.50	75.70	92.60	152.70	774.00	1,774.0	1,118.00	472.00	418.30	455.	296.20	248.40	TOTAL
MEAN	4.08	2.71	2.99	5.09	25.60	59.80	37.10	15.20	14.36	14.68	9.88	8.01	MEAN
A.F.	251	151	184	303	1,570	3,520	3,010	936	859	902	577	493	A.F.

WEST FORK OF HYALITE CREEK

DAILY AND MONTHLY STREAMFLOWS

Table B13

MONTHLY STREAMFLOW

FILE -- SCSDATA
SITE -- WEST FORK HYALITE CREEK
UNIT -- AC-FT
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL
1966	+*******	+*******	+*******	+*******	+*******	+*******	800	4570	5007	1981	768	641	+*******
1967	+*******	+*******	+*******	+*******	+*******	+*******	400	4200	9000	6000	1029	730	+*******
1968	+*******	+*******	+*******	+*******	+*******	+*******	600	5000	8362	6831	2583	1698	+*******
1969	+*******	+*******	+*******	+*******	+*******	+*******	800	5700	6000	4500	1220	701	+*******
1970	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******	+*******
1971	+*******	+*******	+*******	+*******	+*******	+*******	641	+*******	5810	6116	1634	1097	+*******
1972	+*******	+*******	+*******	+*******	+*******	+*******	800	3300	6695	2614	622	425	+*******
1973	+*******	+*******	+*******	+*******	+*******	+*******	+*******	3060	6798	3611	881	936	+*******
1974	+*******	+*******	+*******	+*******	+*******	+*******	+*******	2192	9958	4421	1418	771	+*******
MEAN	+*******	+*******	+*******	+*******	+*******	+*******	673	4003	7203	4509	1269	874	+*******
S.D.	+*******	+*******	+*******	+*******	+*******	+*******	160	1217	1723	1731	628	387	+*******
COEF. VAR.							.238	.304	.239	.384	.494	.442	

PERCENT OF													
ANNUAL MEAN	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	21.6%	38.9%	24.3%	6.9%	4.7%	

SUM OF MONTHLY MEANS 18,533.9

Table B14

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1975

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	14	17	11	11	11	69	220	58	20	14	17	11
2	14	14	11	11	11	87	251	48	24	14	17	11
3	14	14	11	11	11	129	274	48	20	14	17	11
4	14	11	11	11	11	114	274	43	20	14	17	11
5	14	11	11	11	11	122	262	43	20	14	17	11
6	14	11	11	11	11	145	274	43	17	14	17	11
7	14	11	11	11	11	171	251	48	17	14	14	11
8	14	11	11	11	11	154	240	43	17	14	14	11
9	14	14	11	11	11	114	240	39	17	14	14	11
10	14	11	11	11	14	100	220	39	17	14	14	11
11	14	11	11	11	14	94	220	35	17	14	14	11
12	14	11	11	11	20	100	190	35	17	14	14	11
13	14	11	11	11	20	122	190	39	17	14	14	11
14	14	11	11	11	31	145	180	39	17	14	14	11
15	14	11	11	11	48	162	220	35	17	14	14	11
16	14	11	11	11	69	137	180	39	17	14	14	11
17	14	11	11	11	75	129	137	31	20	14	14	11
18	14	11	11	11	75	122	114	31	20	17	14	11
19	14	11	11	11	75	114	114	27	17	17	11	11
20	14	11	11	11	63	114	114	27	17	17	11	11
21	14	11	11	11	52	107	114	24	17	35	11	11
22	14	11	11	11	43	122	94	24	17	31	11	11
23	14	11	11	11	39	145	81	24	20	27	14	11
24	14	11	11	11	35	240	81	27	20	24	14	11
25	14	11	11	11	31	240	75	24	17	24	14	11
26	11	11	11	11	31	210	69	24	17	20	14	11
27	11	11	11	11	31	171	63	24	17	20	11	11
28	14	11	11	11	31	151	58	20	17	17	11	8.8
29	14	------	11	11	35	162	58	20	17	17	11	8.8
30	14	------	11	11	43	190	69	20	17	17	11	8.8
31	17	------	11	------	52	------	75	20	------	17	------	8.8
TOTAL	431	323	341	330	1,026	4,182	5,002	1,041	541	538	414	332.2
MEAN	13.9	11.5	11.0	11.0	33.1	139	161	33.6	18.0	17.4	13.3	10.7
MAX	17	17	11	11	75	240	274	58	24	35	17	11
MIN	11	11	11	11	11	69	58	20	17	14	11	8.3
AC-FT	855	641	676	655	2,040	8,300	9,920	2,060	1,070	1,070	821	659

CAL YR 1975 TOTAL 14,501.2 MEAN 39.7 MAX 274 MIN 8.8 AC-FT 28,760

Table B15

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1976

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.8	8.8	6.7	8.8	11	100	162	43	17	14	11	11
2	11	8.8	6.7	8.8	14	100	129	39	17	14	11	11
3	11	8.8	6.7	8.8	20	129	114	39	14	20	11	8.8
4	11	8.8	8.8	8.8	27	129	114	39	14	17	11	8.8
5	8.8	8.8	8.8	8.8	27	129	122	43	14	17	11	8.8
6	8.8	8.8	8.8	8.8	27	129	129	35	17	17	11	8.8
7	8.8	8.8	8.8	11	35	145	122	35	17	17	11	8.8
8	8.8	8.8	8.8	11	43	145	122	31	17	17	11	8.8
9	8.8	8.8	8.8	14	52	145	114	31	14	17	11	8.8
10	8.8	8.8	8.8	11	69	145	107	29	14	17	11	8.8
11	8.8	8.8	8.8	14	75	137	100	27	14	20	11	8.8
12	8.8	8.8	8.8	17	63	114	107	27	17	20	8.8	8.8
13	8.8	8.8	8.8	17	75	94	87	27	14	17	8.8	8.8
14	8.8	8.8	8.8	17	81	81	81	24	14	17	11	8.8
15	8.8	8.8	8.8	14	75	75	75	24	14	17	11	8.8
16	8.8	8.8	6.7	14	75	81	75	24	14	14	11	8.8
17	8.8	8.8	6.7	14	94	87	75	24	14	14	14	8.8
18	8.8	8.8	6.7	14	94	87	75	20	20	14	11	8.8
19	8.8	8.8	6.7	11	100	94	75	20	17	14	11	8.8
20	8.8	8.8	6.7	11	107	114	69	20	17	14	11	8.8
21	8.8	8.8	6.7	11	107	129	69	20	17	14	11	8.8
22	8.8	8.8	6.7	11	107	137	58	17	17	14	11	8.8
23	8.8	8.8	6.7	11	107	114	58	20	20	14	8.8	8.8
24	8.8	8.8	6.7	11	93	94	52	20	17	14	8.8	8.8
25	8.8	8.8	8.8	11	87	81	52	20	17	14	8.8	8.8
26	8.8	8.8	8.8	11	81	75	48	17	17	14	8.8	8.8
27	8.8	8.8	8.8	11	93	75	48	17	17	14	8.8	8.8
28	8.8	8.8	8.8	11	100	75	43	17	14	14	8.8	8.8
29	8.8	8.8	8.8	11	107	87	43	17	14	14	11	8.8
30	8.8	------	8.8	11	100	129	43	17	14	11	11	8.8
31	8.8	------	8.8	------	100	------	43	17	------	11	------	8.8
TOTAL	279.4	255.2	247.6	352.8	2,246	3,256	2,611	800	474	476	315.4	277.2
MEAN	9.01	8.80	7.99	11.8	72.5	109	84.2	25.8	15.8	15.4	10.5	8.94
MAX	11	8.8	8.8	17	107	145	162	43	20	20	14	11
MIN	8.8	8.8	6.7	8.8	11	75	43	17	14	11	8.8	8.8
AC-FT	554	506	491	700	4,450	6,460	5,180	1,590	940	944	626	550

CAL YR 1976 TOTAL 11,590.6 MEAN 31.8 MAX 162 MIN 6.7 AC-FT 22,990

Table B16

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1977

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.8	6.7	6.7	4.7	63	69	39	14	14	14	11	8.8
2	8.8	6.7	6.7	4.7	63	94	35	14	14	14	11	8.3
3	8.8	6.7	6.7	4.7	58	100	39	14	11	14	11	6.7
4	8.8	6.7	6.7	4.7	48	114	48	14	11	14	11	6.7
5	8.8	6.7	6.7	6.7	39	137	52	14	11	14	11	6.7
6	8.8	6.7	6.7	6.7	35	137	43	14	11	14	11	6.7
7	8.8	6.7	6.7	6.7	35	154	35	14	11	14	8.8	6.7
8	8.8	6.7	4.7	8.8	39	145	35	14	11	14	8.8	6.7
9	8.8	6.7	4.7	11	48	129	31	14	11	14	8.8	6.7
10	8.8	6.7	4.7	11	63	122	31	14	11	14	11	6.7
11	8.8	6.7	4.7	8.8	58	108	27	11	11	11	8.8	6.7
12	8.8	6.7	4.7	8.8	58	100	24	11	11	14	8.8	6.7
13	8.8	6.7	4.7	8.8	63	100	24	11	11	14	8.8	6.7
14	8.8	6.7	4.7	11	69	108	24	11	11	14	8.8	6.7
15	8.8	6.7	4.7	11	69	94	20	11	14	14	8.8	6.7
16	8.8	6.7	4.7	11	58	87	20	11	14	14	8.8	6.7
17	8.8	6.7	4.7	14	48	81	17	11	14	14	8.8	6.7
18	8.8	6.7	3.2	11	39	81	17	11	14	14	8.8	6.7
19	8.8	6.7	3.2	11	39	81	17	11	11	14	6.7	6.7
20	8.8	6.7	3.2	8.8	39	81	17	11	11	14	6.7	6.7
21	8.8	6.7	3.2	11	31	81	17	11	14	14	6.7	6.7
22	8.8	6.7	3.2	11	35	81	17	11	14	14	8.8	6.7
23	8.8	6.7	3.2	17	39	87	17	11	11	14	8.8	6.7
24	8.8	6.7	3.2	27	48	75	17	11	14	14	8.8	6.7
25	8.8	6.7	3.2	35	52	75	17	11	14	14	8.8	6.7
26	8.8	6.7	3.2	39	48	63	17	14	14	14	8.8	6.7
27	6.7	6.7	3.2	43	48	63	14	14	14	14	8.8	6.7
28	6.7	6.7	3.2	48	43	52	14	14	14	14	8.8	6.7
29	6.7	------	3.2	48	43	48	14	11	14	14	8.8	6.7
30	6.7	------	3.2	52	39	43	14	14	17	11	8.8	6.7
31	6.7	------	3.2	------	43	------	14	14	------	11	------	6.7
TOTAL	262.3	187.6	138.7	504.9	1,500	2,790	767	386	373	425	273.1	211.9
MEAN	8.46	6.70	4.47	16.8	48.4	93.0	24.7	12.5	12.6	13.7	9.10	6.84
MAX	8.8	6.7	6.7	52	69	154	52	14	17	14	11	8.8
MIN	6.7	6.7	3.2	4.7	31	43	14	11	11	11	6.7	6.7
AC-FT	520	372	275	1,000	2,980	5,530	1,520	766	750	843	542	420

CAL YR 1977 TOTAL 7,824.5 MEAN 21.4 MAX 154 MIN 3.2 AC-FT 15,520

Table B17

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 0150U

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1978

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	6.7	8.8	6.7	14	20	43	129	43	14	17	11	8.8
2	6.7	8.8	6.7	11	20	43	137	39	14	17	11	8.8
3	6.7	8.8	8.8	11	24	48	145	35	11	14	11	8.8
4	6.7	8.8	6.7	11	20	58	129	35	11	14	11	8.8
5	6.7	8.8	6.7	11	20	75	114	31	11	14	11	8.8
6	6.7	6.7	6.7	11	17	94	107	27	14	11	14	8.8
7	6.7	6.7	6.7	8.8	17	107	107	27	14	11	14	8.8
8	6.7	6.7	6.7	8.8	14	114	129	27	11	11	14	8.8
9	6.7	6.7	6.7	8.8	17	137	137	24	11	11	11	8.8
10	6.7	6.7	6.7	8.8	20	122	137	24	11	11	8.8	8.8
11	6.7	6.7	6.7	8.8	20	87	137	24	14	11	8.8	8.8
12	6.7	6.7	6.7	8.8	20	75	129	24	14	8.8	11	8.8
13	6.7	6.7	6.7	8.8	24	87	129	24	17	8.8	11	8.8
14	6.7	8.8	6.7	8.8	39	107	129	24	17	8.8	14	8.8
15	6.7	8.8	6.7	8.8	69	129	122	24	20	8.8	14	8.8
16	6.7	6.7	6.7	8.8	75	107	129	24	20	8.8	14	11
17	6.7	6.7	6.7	8.8	63	94	122	24	17	8.8	14	11
18	8.8	6.7	6.7	8.8	52	94	107	24	14	8.8	14	11
19	8.8	6.7	6.7	8.8	43	100	100	20	17	8.8	11	8.8
20	8.8	6.7	6.7	8.8	43	87	94	20	17	8.8	11	8.8
21	8.8	6.7	6.7	8.8	48	94	81	17	17	8.8	11	8.8
22	8.8	6.7	6.7	8.8	63	114	75	17	17	6.7	11	8.8
23	6.7	6.7	6.7	8.8	81	129	81	14	20	8.8	11	8.8
24	8.8	6.7	6.7	8.8	87	137	81	14	20	8.8	11	8.8
25	6.7	6.7	6.7	11	75	122	75	14	20	8.8	8.8	8.8
26	6.7	6.7	6.7	14	63	94	63	14	20	11	8.8	8.8
27	6.7	6.7	6.7	14	58	94	63	14	20	8.8	8.8	8.8
28	6.7	6.7	6.7	17	58	122	58	14	20	8.8	8.8	8.8
29	6.7	------	8.8	17	58	145	58	14	20	8.8	8.8	11
30	8.8	------	11	17	52	137	52	14	17	8.8	8.8	14
31	8.8	------	11	------	48	------	48	14	------	11	------	14
TOTAL	224.5	202.3	220.5	317.4	1,328	2,996	3,204	704	480	320.3	336.4	292.0
MEAN	7.24	7.23	7.11	10.6	42.8	99.9	103	22.7	16.0	10.3	11.2	9.42
MAX	8.8	8.8	11	17	87	145	145	43	20	17	14	14
MIN	6.7	6.7	6.7	8.8	14	43	48	14	11	8.7	8.8	8.8
AC-FT	445	401	437	630	2,630	5,940	6,360	1,400	952	635	667	579

CAL YR 1978 TOTAL 10,625.4 MEAN 29.1 MAX 145 MIN 6.7 AC-FT 21,080

Table B18

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	14	11	8.8	8.8	17	63	122	20	8.8	17	17	20
2	14	11	8.8	8.8	17	63	107	17	8.8	17	17	20
3	14	8.8	8.8	6.7	20	75	107	17	6.7	17	24	20
4	11	8.8	8.8	6.7	20	100	87	17	6.7	17	24	20
5	11	8.8	8.8	6.7	27	129	81	17	6.7	17	20	20
6	11	8.8	8.8	8.8	24	129	81	17	6.7	20	20	20
7	11	6.7	8.8	8.8	24	100	75	14	6.7	20	20	20
8	11	6.7	8.8	8.8	20	87	69	14	6.7	20	20	20
9	8.8	6.7	8.8	8.8	17	75	63	11	6.7	20	20	20
10	8.8	6.7	8.8	8.8	17	75	63	11	6.7	20	20	20
11	8.8	6.7	8.8	8.8	14	87	58	11	6.7	20	20	20
12	8.8	6.7	8.8	8.8	14	122	52	11	8.8	20	20	20
13	8.8	6.7	8.8	8.8	14	171	52	17	8.8	20	17	20
14	8.8	6.7	11	8.8	20	162	48	14	11	20	17	20
15	8.8	6.7	14	8.8	31	114	43	11	11	20	20	20
16	8.8	6.7	14	8.8	43	107	43	11	14	24	20	20
17	8.8	6.7	11	8.8	48	114	39	14	17	20	17	20
18	8.8	6.7	8.8	8.8	52	114	39	17	17	20	17	20
19	8.8	6.7	8.8	8.8	58	122	35	14	17	20	17	20
20	8.8	6.7	8.8	8.8	63	122	35	14	17	20	20	20
21	8.8	6.7	8.8	8.8	75	122	35	14	17	20	14	20
22	8.8	6.7	8.8	8.8	87	114	39	14	17	20	17	20
23	8.8	6.7	8.8	8.8	107	114	35	11	17	20	20	20
24	8.8	6.7	8.8	11	137	122	31	14	17	20	20	20
25	8.8	6.7	8.8	8.8	137	137	27	14	17	20	17	20
26	8.8	6.7	8.8	8.8	145	145	27	14	17	20	17	20
27	8.8	6.7	8.8	11	162	162	24	14	17	20	17	20
28	8.8	6.7	8.8	14	137	145	24	11	17	20	20	20
29	8.8	------	8.8	14	100	137	24	8.8	17	20	20	20
30	8.8	------	6.7	17	81	162	20	8.8	17	17	20	20
31	11	------	6.7	------	69	------	20	8.8	------	14	------	20
TOTAL	301.6	204.6	283.4	230.7	1,797	3,491	1,605	421.4	369.5	600	569	620
MEAN	9.73	7.31	9.14	9.36	58.0	116	51.8	13.6	12.3	19.4	19.0	20.0
MAX	14	11	14	17	162	171	122	20	17	24	24	20
MIN	8.8	6.7	6.7	6.7	14	63	20	8.8	6.7	14	14	20
AC-FT	598	406	562	557	3,560	6,920	3,180	836	733	1,190	1,130	1,230

CAL YR 1979 TOTAL 10,543.2 MEAN 28.9 MAX 171 MIN 6.7 AC-FT 20,910

Table B19

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 414 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1980

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	18	20	7.6	7.6	69	48	55	16	14	15	11	9.8
2	16	14	7.6	7.6	71	50	54	16	13	15	11	9.8
3	14	10	7.6	7.2	71	48	56	17	13	14	11	9.8
4	13	9.8	7.6	7.2	75	45	52	16	12	14	12	9.3
5	12	9.3	8.0	6.8	79	42	48	15	11	14	12	
6	11	9.3	8.0	6.8	86	43	45	15	11	14	12	8.8
7	12	9.3	7.6	7.2	94	41	43	15	12	14	12	8.8
8	12	8.8	7.6	6.8	90	43	41	15	14	13	15	9.8
9	12	8.8	7.2	6.8	90	54	39	14	13	13	14	9.8
10	11	8.4	7.2	6.8	81	73	33	14	13	12	13	9.3
11	11	8.0	8.0	6.8	73	97	31	13	27	13	13	8.8
12	11	8.0	9.8	6.8	69	111	29	15	31	13	12	8.8
13	11	8.0	8.8	7.2	63	111	29	15	26	13	10	8.8
14	11	7.6	8.4	8.0	60	104	27	15	24	12	8.8	8.8
15	11	8.0	8.8	9.3	60	97	26	18	21	12	8.8	8.8
16	11	8.8	8.8	8.8	67	87	24	17	20	12	8.8	8.8
17	10	8.8	8.8	10	70	100	24	15	19	12	10	8.8
18	10	8.4	8.4	14	71	125	22	16	18	12	12	8.4
19	12	8.4	8.0	20	75	137	22	18	18	12	12	8.4
20	18	8.4	8.0	32	91	137	21	17	17	12	11	8.8
21	20	8.0	8.0	39	122	154	20	15	19	12	11	8.3
22	19	8.0	7.6	43	150	140	20	15	18	11	9.8	8.3
23	19	8.0	7.6	50	143	113	20	15	18	11	8.8	8.3
24	19	8.0	7.6	58	114	96	19	14	18	12	8.3	8.3
25	18	8.0	7.6	67	94	97	18	14	17	13	8.8	8.8
26	18	7.6	7.2	65	75	96	17	13	17	12	9.8	8.8
27	20	7.6	7.2	64	59	80	17	16	17	12	9.8	8.8
28	21	7.6	6.8	64	52	64	17	15	17	11	9.8	8.8
29	22	8.0	6.8	71	48	61	17	14	16	11	9.8	8.3
30	24	------	7.2	71	49	61	16	13	15	11	9.8	8.8
31	24	------	7.2	------	48	------	17	13	------	11	------	8.3
TOTAL	471	260.9	242.6	785.7	2,459	2,555	919	469	519	388	325.6	279.0
MEAN	15.2	9.00	7.83	26.2	79.3	85.2	29.6	15.1	17.3	12.5	10.9	9.00
MAX	24	20	9.8	71	150	154	56	18	31	15	15	9.8
MIN	10	7.6	6.8	6.8	48	41	16	13	11	11	8.8	8.4
AC-FT	934	518	481	1,560	4,880	5,070	1,820	930	1,030	770	646	553

CAL YR 1980 TOTAL 9,673.8 MEAN 26.5 MAX 154 MIN 6.8 AC-FT 19,190

Table B20

MONTANA DEPT OF NATURAL RESOURCES AND CONSERVATION - WATER RESOURCES DIVISION

WEST FORK HYALITE CR ABOVE RESERVOIR NUMBER 41H 01500

DISCHARGE, IN CUBIC FEET PER SECOND, CALENDAR YEAR 1981

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	8.8	7.2	6.8	6.8	52	97	129	15	11	10	9.3	8.3
2	8.8	6.8	7.2	6.8	59	87	114	15	11	9.8	9.3	8.3
3	8.8	6.8	7.6	6.8	48	87	99	14	11	11	9.3	8.3
4	8.8	6.8	7.6	6.8	39	75	87	14	11	11	9.3	6.8
5	7.6	6.8	7.6	6.8	37	90	87	14	11	10	8.8	6.3
6	7.6	7.2	7.6	6.8	35	137	87	13	11	12	8.8	6.8
7	7.6	7.2	7.6	6.8	29	134	81	13	11	14	8.8	6.3
8	8.8	6.8	7.2	6.3	27	160	58	13	10	14	8.3	6.3
9	8.8	6.8	7.2	6.3	24	122	46	13	9.8	12	8.4	6.8
10	7.6	6.8	7.2	6.8	24	86	46	14	9.8	12	8.4	6.8
11	6.8	6.8	7.6	6.8	23	75	46	14	9.8	13	8.8	6.3
12	7.6	6.8	7.6	6.3	21	94	42	14	9.3	12	8.8	6.8
13	6.8	6.8	7.6	6.8	20	91	39	14	9.3	11	8.3	6.8
14	6.8	6.8	7.6	6.8	20	69	35	14	8.8	11	8.8	6.8
15	6.8	6.8	7.6	7.6	24	58	31	14	8.8	11	8.3	6.8
16	6.8	6.8	7.6	8.8	26	63	29	14	8.8	10	8.8	6.8
17	7.2	6.8	7.6	9.8	25	71	29	14	8.8	11	8.8	6.8
18	7.2	7.2	7.6	11	33	63	27	14	9.8	10	8.3	6.8
19	7.2	7.6	7.6	15	48	79	26	14	8.8	10	8.8	6.3
20	7.2	7.6	7.6	16	63	94	25	14	9.8	10	8.8	6.8
21	7.2	7.2	7.2	15	74	96	21	11	9.3	8.8	8.8	6.8
22	7.2	7.2	7.2	13	99	114	20	11	9.3	8.8	8.8	6.8
23	7.2	7.2	7.2	14	101	129	19	11	9.3	9.8	8.3	6.8
24	7.2	7.6	7.2	22	104	129	19	11	8.8	9.8	8.8	6.8
25	7.2	7.2	7.2	29	119	122	19	11	10	9.8	8.3	6.3
26	7.2	7.2	7.2	27	145	137	18	11	10	9.8	8.8	6.8
27	6.8	7.2	7.6	27	129	145	17	11	12	9.8	8.8	6.8
28	6.8	7.6	7.6	26	119	122	17	11	12	9.8	8.8	6.8
29	6.8	------	7.6	29	114	107	16	11	13	10	8.3	6.8
30	7.2	------	7.6	39	113	113	16	11	11	9.8	8.8	6.8
31	7.2	------	6.8	------	110	------	15	11	------	9.8	------	6.8
TOTAL	231.6	197.6	230.0	404.4	1,904	3,046	1,360	399	302.3	330.8	266.2	216.8
MEAN	7.47	7.06	7.42	13.5	61.4	102	43.9	12.9	10.1	10.7	8.87	6.99
MAX	8.8	7.6	7.6	39	145	160	129	15	13	14	9.8	8.8
MIN	6.8	6.8	6.8	6.8	20	58	15	11	8.8	8.3	8.4	6.8
AC-FT	459	392	456	802	3,780	6,040	2,700	791	600	656	528	430

CAL YR 1981 TOTAL 8,888.7 MEAN 24.3 MAX 160 MIN 6.8 AC-FT 17,630

Table B21

PEAK: 6-29-72
17:30 hrs
611 = 2.08
236 cfs

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

WATER RESOURCES DIVISION

STATION NUMBER 4LH-012500

DAILY DISCHARGE IN SECOND FEET FOR West Fork Hyalite Creek above Reservoir

YEAR ENDING DECEMBER 31, 19 82 TOTAL DISCHARGE IN ACRE FEET 21,560

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	14.00	13.00	13.00	9.80	20.00	44.00	142.00	24.00	16.00	19.00	15.00	11.00	1
2	14.	13.	13.	9.80	28.	41.	126.	33.	16.	19.	14.	11.	2
3	14.	12.	13.	9.80	39.	40.	119.	31.	16.	19.	14.	11.	3
4	14.	13.	13.	9.30	41.	42.	110.	29.	16.	19.	15	11.	4
5	14.	16.	12.	9.30	33.	45.	90.	27.	16.	19.	15	11. ↓	5
6	13.	17.	12.	9.30	27.	47.	80.	26.	16.	19.	14.	11.00	6
7	13.	16.	12.	8.80	27.	47.	87.	26.	15.	19.	13.	9.80	7
8	13.	16.	12.	8.80	26.	46.	104.	26.	15.	18.	14.	8.40	8
9	13.	15	12.	9.30	24.	45.	117.	26.	15.	17.	14.	8.40	9
10	13.	15	12.	9.80	22.	45.	114.	27.	16.	17.	13.	8.80	10
11	13.	15	12.	10.00	20.	49.	104.	26.	16.	18.	13.	9.30	11
12	13.	13.	11.	10.	19.	65.	107.	24.	16.	18.	11.	9.80	12
13	13.	12.	12.	10.	18.	97.	107.	24.	16.	19.	12.	10.00	13
14	13.	12.	12.	10. ↓	20.	111.	106.	23.	16.	19.	11.	11.00	14
15	13.	12.	12.	10.00	21.	111.	96.	24.	16.	21.	12.	11.00	15
16	13.	12.	12.	9.30	28.	125.	80.	23.	16.	21.	12.	11.00	16
17	13.	12.	12.	9.80	34.	135	67.	22.	16.	20.	13.	11.00	17
18	13.	12.	12.	9.80	45.	134.	63.	26.	17.	19.	13.	10.00	18
19	13.	12.	12.	8.80	51.	134.	62.	24.	17.	18.	12.	9.80	19
20	13.	13.	12. ↓	8.80	45	139.	60.	23.	17.	18.	12.	9.80	20
21	13.	13.	12.00	8.80	45.	139.	56.	21.	17.	18.	11.	9.30	21
22	13.	12.	9.80	9.80	50.	141.	55.	23.	16.	18.	11.	9.30	22
23	14.	11.	9.80	11.00	65.	148.	54.	21.	16.	17.	11.	9.80	23
24	13.	12.	9.30	13.	69.	140.	52.	20.	15	17.	11.	9.80	24
25	13.	12.	8.80	14.	80.	145	49.	19.	16.	17.	11.	9.30	25
26	13.	13.	9.30	13.	99.	162.	45.	18.	16.	17.	12.	9.80	26
27	12.	12. ↓	9.30	14.	106.	167.	42.	16.	20.	16.	12.	9.30	27
28	12.	13.00	9.30	16.	94.	186.	40.	16.	21.	16.	12.	9.80	28
29	12.	.	9.30	17. ↓	73.	172. ↓	37.	16.	20. ↓	16. ↓	11.	9.80	29
30	13. ↓	.	9.30	17.00	56. ↓	160.00	35. ↓	18. ↓	20.00	17. ↓	11.00	9.80	30
31	13.00	.	9.80	.	45.	.	37.00	17.00	.	15.	.	9.80	31
TOTAL	406.00	369.00	349.00	334.10	1,378.00	3,138.00	2,443.00	729.00	497.00	559.00	325.00	310.40	TOTAL
MEAN	13.10	13.20	11.30	10.80	44.50	104.00	78.80	23.50	16.60	18.00	10.80	10.00	MEAN
A.F.	805	732	692	663	2,730	6,200	4,850	1450	986	1,110	644	616	A.F.

PEAK DISCHARGE SUMMARIES

- Hyalite Creek at Hyalite Ranger Station
- East Gallatin River
- Gallatin River near Gallatin Gateway
- Gallatin River at Logan

Table B22

RUN DATE 11/02/83 PAGE 1

FILE: 060500PD LIBRARY: A24DATA VOLUME: VOL555

SITE HYALITE CREEK ANNUAL PEAK DISCHARGES
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1895			*MISSING*
1896			*MISSING*
1897			*MISSING*
1898	06	00	956.0000
1899	06	00	760.0000
1900			*MISSING*
1901			*MISSING*
1902	06	00	500.0000
1904			*MISSING*
1905			*MISSING*
1934			*MISSING*
1935	06	00	441.0000
1936	06	00	205.0000
1937	06	00	330.0000
1938	05	00	502.0000
1939	05	00	286.0000
1940	06	00	360.0000
1941	06	00	206.0000
1942	05	00	375.0000
1943	06	00	341.0000
1944	06	00	375.0000
1945	06	00	300.0000
1946	06	00	222.0000
1947	06	00	347.0000
1948	05	00	641.0000
1949	05	00	338.0000
1950	06	00	295.0000
1951	05	00	350.0000
1952	01	00	422.0000
1953	06	00	472.0000
1954	06	00	344.0000
1955	06	00	364.0000
1956	03	00	516.0000
1957	06	00	335.0000
1958	05	00	301.0000
1959	06	00	600.0000
1960	06	00	348.0000
1961	06	00	245.0000
1962	06	00	285.0000
1963	06	00	360.0000
1964	06	00	394.0000
1965	06	00	374.0000
1966	06	00	360.0000
1967	06	00	540.0000
1968	06	00	600.0000
1969	06	00	509.0000
1970	05	00	866.0000
1971	06	00	521.0000
1972	06	00	325.0000
1973	05	00	689.0000
1974	06	00	799.0000

Table B22 (continued)

FILE: 060500PD LIBRARY: A24DATA VOLUME: VOL555

SITE HYALITE CREEK ANNUAL PEAK DISCHARGES
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1975	07	00	729.0000
1976	06	00	420.0000
1977	06	00	248.0000
1978	06	00	263.0000
1979	06	00	349.0000
1980	05	00	224.0000
1981	05	00	948.0000
1982	06	00	413.0000

THE MEAN IS	437.1176
THE MAXIMUM IS	956
THE MINIMUM IS	205
THE STANDARD DEVIATION IS	188.0439
THE COEFFICIENT OF VARIATION IS	.4302

Table B-23

FILE: 06043APD LIBRARY: A24DATA VOLUME: VOL555

SITE EAST GALLATIN RIVER AT BOZEMAN
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1940	06	00	492.0000
1941	03	00	295.0000
1942	04	00	615.0000
1943	03	00	577.0000
1944	06	00	577.0000
1945	02	00	412.0000
1946	03	00	367.0000
1947	06	00	1070.0000
1948	05	00	1170.0000
1949	04	00	304.0000
1950	04	00	1030.0000
1951	04	00	592.0000
1952	05	00	895.0000
1953	06	00	1240.0000
1954	06	00	285.0000
1955	05	00	460.0000
1956	05	00	451.0000
1957	06	00	585.0000
1958	05	00	422.0000
1959	04	00	816.0000
1960	05	00	605.0000
1961	05	00	207.0000
1981	05	00	2460.0000

THE MEAN IS	692.0435
THE MAXIMUM IS	2460
THE MINIMUM IS	207
THE STANDARD DEVIATION IS	483.9083
THE COEFFICIENT OF VARIATION IS	.6992

Table B24

FILE: 06043CFS LIBRARY: A24DATA VOLUME: VOL555

SITE GALLATIN RIVER NEAR GALLATIN GATEWAY - ANNUAL PEAK DISCHARGES
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1890	06	00	3800.0000
1891	06	00	2975.0000
1892	06	00	3060.0000
1893	06	00	6800.0000
1894	06	00	8060.0000
1931	06	00	2940.0000
1932	06	00	5780.0000
1933	06	00	4270.0000
1934	05	00	1740.0000
1935	06	00	4340.0000
1936	05	00	3660.0000
1937	06	00	3120.0000
1938	06	00	4550.0000
1939	05	00	3170.0000
1940	06	00	3660.0000
1941	05	00	2820.0000
1942	06	00	6050.0000
1943	06	00	6430.0000
1944	06	00	3600.0000
1945	06	00	4450.0000
1946	06	00	4360.0000
1947	06	00	5250.0000
1948	06	00	6740.0000
1949	05	00	4110.0000
1950	06	00	5030.0000
1951	05	00	3940.0000
1952	06	00	6910.0000
1953	06	00	6010.0000
1954	06	00	3790.0000
1955	06	00	4480.0000
1956	05	00	7030.0000
1957	06	00	5970.0000
1958	05	00	5010.0000
1959	06	00	7230.0000
1960	06	00	4940.0000
1961	06	00	3670.0000
1962	06	00	4780.0000
1963	06	00	4800.0000
1964	06	00	6450.0000
1965	06	00	7010.0000
1966	05	00	4530.0000
1967	06	00	5960.0000
1968	06	00	6570.0000
1969	05	00	5350.0000
1970	06	00	9240.0000
1971			*MISSING*
1972	06	00	6030.0000
1973	06	00	6500.0000
1974	06	00	9690.0000
1975	07	00	7950.0000
1976	06	00	5870.0000

Table B24 (continued)

RUN DATE 11/02/83 PAGE 5

FILE: 06043CFS LIBRARY: A24DATA VOLUME: VOL555

SITE GALLATIN RIVER NEAR GALLATIN GATEWAY - ANNUAL PEAK DISCHARGES
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1977	06	00	3370.0000
1978	06	00	5230.0000
1979	05	00	4730.0000
1980	05	00	4510.0000
1981	06	00	5920.0000

THE MEAN IS	5259.7273
THE MAXIMUM IS	9690
THE MINIMUM IS	1740
THE STANDARD DEVIATION IS	1674.5974
THE COEFFICIENT OF VARIATION IS	.3184

Table B25

FILE: 060525PD LIBRARY: A24DATA VOLUME: VOL555

SITE GALLATIN RIVER AT LOGAN
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1893			*MISSING*
1894			*MISSING*
1895	06	00	3904.0000
1896	06	00	6550.0000
1897	05	00	6460.0000
1898	06	00	7300.0000
1899	06	00	9860.0000
1900	05	00	4805.0000
1901			*MISSING*
1902	06	00	4630.0000
1903	06	00	4500.0000
1904	05	00	5400.0000
1905	06	00	3090.0000
1928			*MISSING*
1929	06	00	4970.0000
1930	05	00	2820.0000
1931	06	00	2970.0000
1932	06	00	4570.0000
1933	06	00	3700.0000
1934			*MISSING*
1935	06	00	3930.0000
1936	05	00	4370.0000
1937	06	00	3650.0000
1938	05	00	5590.0000
1939	05	00	2730.0000
1940	06	00	3500.0000
1941	06	00	1990.0000
1942	06	00	5940.0000
1943	06	00	6160.0000
1944	06	00	6820.0000
1945	06	00	3500.0000
1946	06	00	3730.0000
1947	06	00	6160.0000
1948	06	00	7870.0000
1949	05	00	3900.0000
1950	06	00	3940.0000
1951	05	00	6140.0000
1952	06	00	6640.0000
1953	06	00	5930.0000
1954	06	00	3330.0000
1955	06	00	4050.0000
1956	05	00	7190.0000
1957	06	00	4990.0000
1958	05	00	3620.0000
1959	06	00	5120.0000
1960	05	00	4320.0000
1961	05	00	2150.0000
1962	06	00	4830.0000
1963	06	00	4750.0000
1964	06	00	6230.0000
1965	06	00	5100.0000

Table B25 (continued)

FILE: 060525PD LIBRARY: A24DATA VOLUME: VOL555

SITE GALLATIN RIVER AT LOGAN
DATA DESCRIPTION ANNUAL PEAK DISCHARGES
DATA UNITS: CFS

YEAR	MONTH	DAY	DATA
1966	05	00	3460.0000
1967	06	00	5950.0000
1968	06	00	7280.0000
1969	06	00	5200.0000
1970	06	00	9390.0000
1971	06	00	8480.0000
1972	06	00	5130.0000
1973	06	00	5550.0000
1974	06	00	9170.0000
1975	07	00	7770.0000
1976	06	00	6660.0000
1977	06	00	2620.0000
1978	06	00	4970.0000
1979	05	00	4300.0000
1980	05	00	4550.0000
1981	05	00	7380.0000
1982	06	00	7160.0000

THE MEAN IS	5202.2063
THE MAXIMUM IS	9840
THE MINIMUM IS	1990
THE STANDARD DEVIATION IS	1794.9599
THE COEFFICIENT OF VARIATION IS	.345

Table B26

Hydrologic Data Transfer Summary
(Hyalite Creek at Ranger Station to Middle Creek Dam)

Exceedance Probability	Peak Discharge Hyalite Creek @ Ranger Station (cfs)	Exponent 1/ For Transfer, a	Peak Discharge 2/ @ Dam (cfs)
.002	1510	0.70	1006
.005	1280	0.70	853
.010	1120	0.73	734
.020	978	0.75	633
.040	842	0.77	539
.100	676	0.80	425
.200	556	0.82	346
.500	394	0.87	238
.800	289	0.88	174
.900	250	0.90	148
.950	223	0.90	132
.990	183	0.90	109

Notes:

1/ Reference: Parrett and Omang, 1981

2/ $$Q_{Dam} = Q_{RS} \left(\frac{DA_{Dam}}{DA_{RS}}\right)^a = Q_{RS} \left(\frac{27}{48.2}\right)^a$$

Where: Q = Peak Discharge, cfs
Dam = Middle Creek Dam
RS = Ranger Station
a = Exponent for transfer
DA = Drainage Area

APPENDIX C - CLIMATE DATA

Table C1

Climate Station Index

Gage Name	Gage Number	Elevation, ft NGVD	Years of Record[1] Temp	Precip
Bozeman, MT State Univ.	1044	4856	100	104
Hebgen Dam	4038	6489	64	67
Yellowstone Park	9905	6230	89	93
Lick Creek[2]	10D13	6860	20 (1964-83, incomplete)	18 (1965-82, incomplete)
Shower Falls[2]	10D16	8100	18 (1966-83, incomplete)	18 (1965-82, incomplete)

Notes:

1/ Includes up to calendar year end 1982 for all but the Snow Survey Stations.

2/ SCS Snow Survey Stations.

MONTHLY PRECIPITATION DATA

- Bozeman
- Hebgen Dam (January - December)
- Hebgen Dam (January - April)
- Hebgen Dam (January - May)
- Yellowstone Park
- Lick Creek
- Shower Falls

BOZEMAN MONTHLY PRECIPITATION

Table C2

MONTHLY PRECIPITATION

FILE -- BOZPRECP
SITE -- BOZEMAN
UNIT -- INCHES
NOTE -- ANY MONTH WITH ****.** INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1899	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	1.50	.49	1.35	******.**
1900	.11	1.60	.39	3.24	2.51	.39	1.32	.68	1.24	1.63	.05	.52	14.18
1901	.80	.55	1.21	1.29	5.01	1.56	.12	.64	2.03	.09	.73	1.46	15.49
1902	.41	.66	.77	1.21	3.90	2.60	.87	1.13	2.07	.30	1.11	.73	15.76
1903	.78	.33	.67	3.42	2.58	2.45	2.76	.50	1.11	.64	1.62	.78	17.64
1904	.85	2.55	2.98	1.36	2.02	1.74	1.11	.86	.06	.56	.37	2.03	16.49
1905	.23	.75	.77	.80	3.23	2.62	1.30	1.21	1.48	1.13	.78	.38	14.68
1906	.74	.75	.92	1.61	2.34	3.39	.47	1.80	1.38	1.35	1.70	.43	16.88
1907	.93	.80	1.86	.59	3.16	3.79	2.46	1.37	.41	1.08	.36	.42	17.23
1908	.52	1.27	1.40	1.36	9.54	4.57	.32	1.09	1.72	1.97	.35	.36	24.46
1909	.72	.35	1.42	1.82	4.15	1.04	1.98	1.29	5.54	.77	2.36	.90	22.34
1910	.82	.82	.62	1.86	2.72	1.35	.73	1.46	3.51	2.74	1.70	.41	18.74
1911	1.77	.33	.05	1.57	3.56	3.04	.84	1.52	1.73	2.08	1.00	.65	18.14
1912	.92	.39	1.86	3.59	2.66	2.69	1.91	1.63	1.66	3.23	.37	.74	21.64
1913	.78	.47	.44	1.65	2.53	3.19	2.17	.90	2.00	3.15	1.24	.15	18.67
1914	.73	.56	.64	2.02	2.05	3.53	1.28	.11	3.33	1.92	.12	.17	16.45
1915	.91	.05	1.95	2.60	3.67	4.44	3.91	.38	3.34	.62	1.38	1.75	24.99
1916	.95	.78	2.04	2.10	2.99	2.33	1.58	1.38	1.99	2.40	1.11	1.64	21.18
1917	1.87	1.01	.91	1.72	2.37	2.46	.36	.53	2.64	.42	.31	1.18	15.68
1918	1.98	.81	1.24	1.35	2.82	2.70	1.72	.79	2.43	1.05	1.71	.29	18.88
1919	.51	.78	.65	.96	2.10	.09	.36	.97	.87	1.81	.59	1.33	11.02
1920	.32	.51	2.02	2.41	3.33	3.58	1.21	1.05	.83	1.71	1.07	1.21	19.24
1921	1.01	.40	1.82	1.34	2.50	1.34	2.25	.38	1.26	.29	1.08	1.52	15.19
1922	.60	.72	.80	1.67	2.85	2.86	2.49	1.60	.95	.93	1.47	.80	17.74
1923	.25	.49	.28	.73	4.09	3.44	1.53	1.17	.92	1.34	.29	.74	15.27
1924	1.82	1.46	1.71	2.82	1.90	1.46	1.95	.20	2.89	1.82	2.37	.54	20.93
1925	.49	.41	1.32	2.54	1.26	2.30	2.22	1.30	3.08	1.98	.72	1.78	19.40
1926	.48	1.40	.56	.35	4.82	1.59	.94	1.98	3.14	1.03	1.65	1.88	19.82
1927	.75	.99	.78	1.93	5.06	1.46	2.53	2.29	1.12	1.40	2.59	.94	21.83
1928	1.51	1.04	1.30	1.23	1.16	3.80	.81	1.60	.48	1.53	.54	1.17	16.17
1929	1.54	.75	1.26	1.11	1.98	2.84	1.42	.54	.87	1.63	1.00	.83	15.77
1930	.35	.40	.75	1.28	.72	.85	1.64	2.31	1.05	3.41	.97	.62	14.35
1931	1.10	1.13	1.37	1.21	2.23	1.50	1.46	.37	2.13	.81	1.19	.79	15.29
1932	1.02	.31	2.25	2.56	.69	3.29	1.55	1.54	.21	2.23	1.13	.56	17.34
1933	.77	.66	.96	1.37	2.56	1.13	.40	3.48	1.87	1.78	.34	.57	15.89
1934	.47	.71	1.33	.19	.88	2.35	.40	.07	1.06	1.47	.32	1.29	10.54
1935	.75	.29	3.24	1.92	2.35	1.76	.77	.70	.15	2.35	.67	.51	15.46
1936	1.19	1.25	.67	.93	1.31	2.13	.09	1.48	1.04	.74	.66	1.29	12.78
1937	1.64	1.15	1.27	2.42	.32	3.90	2.16	.20	2.33	.51	.67	.92	17.99
1938	.38	.46	3.23	1.55	5.63	1.82	1.20	.88	.09	3.10	1.89	.14	20.34
1939	.74	.52	1.02	.99	1.91	3.71	.69	.94	1.29	1.17	.05	1.00	14.03
1940	1.48	1.22	1.28	3.33	1.38	2.99	.61	.45	2.48	1.05	1.25	1.11	18.63
1941	.20	.44	.78	3.50	1.45	3.17	1.26	1.80	4.60	1.17	2.74	1.76	22.86
1942	2.15	1.71	1.48	.79	2.44	2.68	.47	.53	1.54	1.22	1.78	.45	17.24
1943	.88	.32	1.07	3.07	2.10	2.50	1.90	1.24	.91	1.95	.74	.59	17.27
1944	.12	.73	.96	.60	3.00	7.98	1.70	1.42	2.13	.97	.73	.59	20.92
1945	.36	.47	1.15	1.15	3.67	4.10	.76	1.73	1.84	1.15	1.18	1.97	19.53
1946	1.26	1.13	2.36	1.43	3.03	1.38	1.47	.76	1.37	2.35	.95	.59	18.58
1947	.83	.44	3.02	1.38	1.05	6.78	.37	.80	4.58	.69	3.25	1.35	24.53
1948	1.11	.65	.89	2.04	2.37	4.87	1.58	1.91	.60	.52	1.53	1.43	19.50

Table C2 (continued)

MONTHLY PRECIPITATION

FILE -- BOZPRECP
SITE -- BOZEMAN
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE 11/02/83

1949	1.39	.86	1.07	2.06	1.92	3.73	.51	.55	2.21	1.21	.51	.59	17.11
1950	.74	.75	2.00	.99	2.07	2.16	2.74	1.86	1.99	.87	1.10	.92	18.18
1951	.46	.49	1.75	1.84	1.52	1.61	.87	2.36	2.23	4.46	.81	1.80	20.20
1952	1.24	1.19	1.59	1.99	6.63	2.02	1.28	1.16	.56	.21	1.29	.41	19.56
1953	.65	1.05	1.04	2.05	3.23	3.13	.53	.42	1.00	1.39	1.13	.68	16.40
1954	1.10	.13	1.19	.44	1.70	3.70	.66	1.32	1.21	.88	.07	.28	12.68
1955	.54	1.00	1.33	3.51	2.70	2.23	1.55	.12	1.11	2.04	.78	2.16	19.06
1956	.78	.16	1.27	1.66	2.06	1.06	.46	.95	.97	1.12	.52	.29	11.30
1957	.74	.20	1.16	1.27	2.80	4.68	1.52	.70	.85	1.46	.56	.58	16.52
1958	.82	.86	1.52	1.91	.37	2.43	3.25	2.52	1.40	.41	1.69	.91	18.11
1959	.79	1.12	1.58	1.37	4.08	2.42	1.63	.74	2.35	1.93	.90	.67	19.58
1960	.78	.71	1.77	2.32	2.33	1.18	.37	2.14	.43	.88	1.02	.68	14.61
1961	.11	.84	.82	2.49	1.39	.82	.71	.58	4.90	2.11	1.10	.25	16.12
1962	1.27	.49	1.32	1.12	3.86	1.55	3.08	2.14	.64	1.15	3.01	.34	19.97
1963	1.76	.53	1.06	1.98	3.29	3.13	1.09	.80	2.00	.94	.61	.67	17.86
1964	.48	.67	1.19	2.12	3.11	3.72	.91	3.80	.08	1.29	1.57	.91	19.84
1965	.97	.50	.45	2.24	4.16	3.76	.68	2.23	2.42	.45	.75	.61	19.22
1966	.75	.22	1.18	1.10	2.54	2.84	.46	1.26	1.08	1.53	.98	.69	14.63
1967	1.17	.76	3.28	1.45	2.05	4.44	1.12	.27	1.21	3.48	2.09	1.62	22.93
1968	.91	.44	2.13	1.42	4.03	3.78	1.08	2.63	2.77	1.37	2.65	.35	23.55
1969	1.95	.44	.46	2.51	1.92	7.37	1.70	1.50	.86	3.02	.58	1.09	23.40
1970	.70	.32	2.21	1.55	3.42	1.48	3.15	.97	2.23	1.58	1.41	.62	19.63
1971	.96	1.01	.74	2.82	2.20	2.86	.29	.70	2.41	.65	.77	.56	15.97
1972	.86	.66	1.24	1.91	1.73	3.07	1.20	1.44	2.00	2.59	.63	.49	17.82
1973	1.10	.04	1.89	2.84	1.44	4.43	.50	1.63	2.89	1.74	1.27	1.29	21.06
1974	.42	.43	1.71	1.87	3.00	.96	.48	2.65	1.46	1.60	.67	1.02	16.27
1975	1.58	1.11	1.08	1.77	4.88	3.46	1.89	1.13	1.67	4.29	1.33	1.10	25.28
1976	.60	.52	1.03	3.35	1.95	4.00	1.64	.79	3.29	1.77	.20	.22	19.36
1977	.60	.06	2.39	.57	3.84	2.21	2.24	2.13	2.38	1.44	1.19	1.19	20.73
1978	1.03	.87	.76	.93	4.04	2.11	2.17	.82	4.22	.81	1.87	.72	20.34
1979	1.03	.75	.77	1.92	2.33	3.66	.59	1.51	.07	1.54	.96	.30	15.43
1980	1.17	1.29	1.67	.39	5.68	2.85	1.12	1.85	3.40	.73	.77	.31	21.22
1981	.50	1.31	.99	1.99	6.99	3.96	1.14	.50	1.31	2.13	1.13	.75	22.70
1982	1.06	.78	2.80	2.20	2.88	4.04	1.52	1.01	2.92	1.34	.52	1.35	22.42
1983	.12	.59	1.35	2.02	2.46	2.87	####.##	####.##	####.##	####.##	####.##	####.##	######.##
MEAN	.88	.72	1.35	1.76	2.84	2.82	1.32	1.23	1.81	1.51	1.07	.86	18.24
S.D.	.47	.41	.69	.80	1.49	1.40	.30	.74	1.16	.88	.68	.49	3.22
COEF. VAR.	.536	.575	.512	.454	.524	.496	.612	.606	.642	.586	.636	.572	.176
PERCENT OF ANNUAL MEAN	4.9%	4.0%	7.4%	9.7%	15.6%	15.5%	7.2%	6.8%	10.0%	8.3%	5.9%	4.8%	

SUM OF MONTHLY MEANS 18.2

HEBGEN DAM MONTHLY PRECIPITATION

Table C3

MONTHLY PRECIPITATION

FILE -- MOPRECIP
SITE -- HEBGEN DAM
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE 11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1904	+####.##	+####.##	+####.##	+####.##	+####.##	1.17	1.67	1.19	.59	1.12	0.00	1.01	+#####.##
1905	.57	.34	1.31	.49	2.58	1.75	1.21	.66	1.02	.74	.90	.69	12.26
1906	1.37	.97	+####.##	.71	2.56	1.79	.93	1.40	.93	.61	.36	2.11	+#####.##
1907	2.07	.48	3.01	.42	1.57	2.18	1.81	1.14	+####.##	.81	.13	.88	+#####.##
1908	+####.##	+####.##	+####.##	+####.##	+####.##	3.24	1.30	2.67	1.40	2.14	.17	+####.##	+#####.##
1909	+####.##	1.80	.27	.39	1.86	1.19	1.74	1.05	3.08	.61	1.87	1.15	+#####.##
1910	2.85	.56	.13	.76	+####.##	.29	1.16	.24	+####.##	1.65	1.92	1.07	+#####.##
1911	2.50	.60	.79	.54	2.65	2.57	1.12	.56	.94	1.20	1.07	1.01	15.55
1912	.95	.49	1.79	1.62	1.55	2.01	4.14	1.92	.47	2.16	.64	.40	18.13
1913	3.98	1.03	2.84	2.56	2.35	3.90	4.53	.79	1.35	1.89	1.23	.61	27.05
1914	2.26	2.11	.48	.63	1.34	4.26	1.39	0.00	1.36	1.75	.15	.17	15.90
1915	2.64	2.05	1.71	2.01	5.15	2.00	3.05	.95	3.53	.68	2.23	3.06	29.05
1916	3.63	1.91	2.50	.95	2.71	1.61	1.23	.68	1.04	2.84	2.25	3.41	24.75
1917	2.63	2.35	1.79	3.14	1.77	1.82	.32	.50	2.71	.38	.99	3.78	22.17
1918	4.24	2.40	2.31	1.37	1.65	2.37	3.58	1.65	3.01	2.70	.63	.85	26.75
1919	1.18	3.25	1.64	1.01	1.77	.09	.77	.74	3.15	3.76	1.70	1.80	21.06
1920	.93	1.35	3.23	2.36	3.19	2.46	1.18	1.45	2.39	2.53	1.64	2.09	24.79
1921	3.91	1.44	1.79	1.86	4.54	1.45	.78	1.79	1.12	.88	2.53	2.01	24.09
1922	2.84	2.74	2.39	2.11	2.15	1.10	1.65	3.47	.25	.40	.98	3.00	23.08
1923	2.66	1.25	1.90	2.71	1.94	4.06	3.66	2.03	.72	1.71	.84	2.50	25.97
1924	2.18	2.38	2.27	.91	1.00	1.00	3.22	.91	2.78	2.58	2.62	2.76	24.50
1925	3.58	2.56	1.40	2.37	2.33	3.69	1.82	1.17	3.04	1.73	6.28	3.74	33.70
1926	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+#####.##
1927	1.98	2.60	1.11	.91	3.67	1.32	.47	1.89	1.75	2.71	5.46	2.90	26.76
1928	3.39	.70	2.42	1.34	.54	3.34	1.33	1.10	.28	1.59	1.63	1.67	19.33
1929	3.13	3.19	1.93	1.56	1.22	2.75	1.65	1.31	1.46	1.52	2.43	1.54	23.68
1930	3.14	3.05	1.31	2.36	1.32	1.84	1.93	4.40	2.75	3.29	1.89	1.00	28.27
1931	1.21	1.50	1.23	.57	1.50	1.52	.92	1.54	1.74	.84	3.20	3.57	19.34
1932	2.55	1.48	5.06	1.60	1.98	3.23	2.42	1.47	.35	1.12	2.91	3.09	27.25
1933	4.48	2.95	.88	1.70	2.24	1.54	.61	2.08	1.28	.94	1.04	4.14	23.97
1934	1.92	.66	2.16	1.06	.16	3.16	.67	.79	1.62	2.15	2.49	2.70	19.53
1935	2.40	.88	3.10	3.69	2.37	1.10	.55	.39	.72	2.70	2.70	1.78	22.38
1936	5.16	2.47	1.11	2.49	1.01	1.82	3.31	2.62	.97	.61	.54	2.82	24.92
1937	3.44	3.56	3.56	2.16	.45	3.91	3.11	.91	1.53	1.41	3.51	3.68	31.22
1938	3.66	4.79	4.97	2.35	3.30	2.91	3.86	1.76	.34	6.22	2.91	2.10	33.86
1939	3.96	2.72	2.22	1.12	1.63	2.21	1.43	.34	1.34	2.35	.08	2.15	21.54
1940	3.18	5.33	3.86	2.99	1.26	2.78	2.16	.06	5.42	1.40	3.27	2.55	34.25
1941	1.64	1.30	1.20	1.02	4.01	3.61	2.38	2.60	3.34	1.39	3.91	2.79	29.18
1942	2.68	1.99	1.02	2.01	4.28	1.36	.35	.44	.71	1.77	3.92	3.29	23.92
1943	2.75	2.04	2.36	2.89	2.73	3.96	1.75	.86	.75	3.57	.78	1.27	25.70
1944	.66	3.02	2.34	.92	2.85	5.93	1.16	.32	1.42	.53	2.91	1.34	23.44
1945	1.15	2.16	1.47	1.15	4.30	4.94	.54	2.86	3.02	.56	3.48	3.33	29.00
1946	2.53	2.97	4.54	.75	2.42	.67	1.54	.89	1.16	3.71	3.57	2.73	27.47
1947	1.92	1.50	1.77	1.10	2.15	4.55	1.08	1.15	3.17	2.46	4.80	1.67	27.31
1948	2.81	1.49	2.26	2.36	2.57	3.16	.96	1.20	1.68	.90	4.26	3.78	27.42
1949	3.03	3.17	.73	.87	2.50	2.55	.69	.85	1.52	1.89	1.87	3.13	22.79
1950	2.62	2.20	3.36	.95	1.24	2.01	2.12	1.28	1.07	2.53	1.74	1.79	22.90
1951	1.89	2.64	2.61	1.05	2.36	2.17	1.43	4.62	.13	3.25	2.17	5.59	29.91
1952	4.42	2.72	3.01	.31	2.09	3.52	1.92	.65	.34	0.00	.75	2.90	23.12
1953	3.97	2.67	1.95	1.44	5.88	2.40	.30	.67	.55	.11	2.14	2.93	25.00

Table C3 (continued)

MONTHLY PRECIPITATION

FILE -- HDPRECIP
SITE -- HEBGEN DAM
UNIT -- INCHES
NOTE -- ANY MONTH WITH ****.** INDICATES NO DATA AVAILABLE

11/02/83

1954	3.44	1.54	1.48	1.95	.74	5.35	1.65	1.34	.50	.40	.92	1.91	21.21
1955	2.46	2.18	1.57	.95	3.16	2.96	2.17	.66	.88	1.99	2.29	4.63	25.30
1956	3.21	2.00	1.22	1.78	2.87	.88	1.85	.77	1.71	4.03	1.64	2.44	24.39
1957	3.19	2.04	1.75	2.58	3.06	2.34	1.86	1.40	.35	2.38	1.63	2.77	25.34
1958	1.28	1.92	3.36	2.60	2.09	3.54	1.90	1.64	1.85	.65	2.28	2.00	25.09
1959	2.64	3.69	3.35	1.17	6.02	4.07	.58	.77	3.04	2.24	1.31	.96	29.33
1960	2.42	2.86	1.19	2.70	2.32	1.33	.51	2.48	.50	2.65	3.46	2.31	25.72
1961	.66	4.36	2.39	1.62	1.91	.96	2.24	4.50	4.26	3.61	2.74	3.30	33.04
1962	3.01	4.25	3.15	1.22	4.77	2.24	1.55	1.39	1.46	1.28	3.24	.90	28.45
1963	3.73	2.49	1.97	3.59	2.72	6.11	.54	.51	4.11	1.78	3.13	2.12	33.18
1964	3.44	2.36	4.00	2.98	2.44	7.50	1.12	1.88	.31	1.91	3.92	7.10	38.05
1965	6.72	1.17	.62	4.59	2.27	3.15	1.42	1.82	1.70	.37	1.71	1.81	27.25
1966	2.84	2.26	2.06	1.15	1.86	2.66	.53	1.12	3.22	1.00	3.17	4.09	25.96
1967	5.37	1.77	3.95	3.12	2.59	4.18	2.70	.15	1.19	3.57	2.40	5.53	37.01
1968	3.85	2.77	1.28	.99	3.05	3.94	.79	6.23	2.31	1.30	4.22	3.23	34.00
1969	6.40	3.50	.70	1.20	1.90	3.70	2.00	.60	1.40	1.20	2.50	3.00	28.09
1970	4.80	1.10	4.30	2.20	.30	4.30	2.50	1.20	2.20	2.80	3.80	4.50	33.99
1971	5.07	2.65	2.34	2.34	2.07	4.02	1.00	4.02	2.48	1.54	2.42	5.68	35.62
1972	2.81	2.02	2.42	1.47	2.25	4.29	1.29	2.61	3.87	2.44	2.42	3.09	30.97
1973	2.53	.89	1.92	1.94	2.97	2.93	2.36	2.03	3.60	1.40	5.01	4.16	31.72
1974	4.04	1.61	7.46	.86	1.97	.59	.55	1.53	1.64	.12	1.14	3.90	25.40
1975	3.66	4.30	4.55	4.08	1.96	4.59	2.40	2.59	.49	2.58	4.14	3.35	33.68
1976	3.75	2.62	2.45	2.66	2.33	5.12	1.45	2.40	3.27	2.03	.28	2.22	30.57
1977	2.23	1.15	1.64	.49	4.09	3.50	2.83	3.44	2.63	.75	2.53	5.65	30.92
1978	4.10	3.74	1.17	4.67	2.15	1.76	2.25	.72	2.13	.23	1.77	2.92	27.61
1979	1.96	3.99	2.45	.57	1.39	1.51	1.02	3.31	1.30	2.20	1.69	.95	22.33
1980	3.25	2.50	1.05	.48	6.20	3.38	2.26	2.82	2.73	.41	1.86	2.79	29.72
1981	1.49	2.30	1.37	1.55	4.18	3.29	1.42	.48	1.21	2.97	2.35	3.79	26.99
1982	4.69	1.83	6.72	4.66	1.82	2.40	2.40	2.22	2.73	2.63	2.49	4.98	39.56
1983	1.92	4.07	4.02	1.09	1.07	4.59	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+*****.**
MEAN	2.94	2.25	2.32	1.75	2.43	2.80	1.66	1.57	1.77	1.78	2.23	2.68	26.86
S.D.	1.27	1.07	1.36	1.05	1.25	1.44	.95	1.18	1.15	1.13	1.33	1.39	5.54
COEF. VAR.	.432	.473	.586	.601	.515	.514	.572	.754	.648	.637	.597	.518	.206
PERCENT OF ANNUAL MEAN	11.2%	8.6%	8.9%	6.7%	9.3%	10.7%	6.4%	6.0%	6.8%	6.8%	8.5%	10.2%	

SUM OF MONTHLY MEANS 26.2

HEBGEN DAM JANUARY THROUGH APRIL PRECIPITATION

Table C4

FILE: HPRECJTA LIBRARY: A240ATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION JAN THRU APRIL PRECIPITATION
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1904	05	00	*MISSING*
1905	05	00	2.7100
1906	05	00	*MISSING*
1907	05	00	5.9800
1908	05	00	*MISSING*
1909	05	00	*MISSING*
1910	05	00	4.3000
1911	05	00	4.4300
1912	05	00	4.8500
1913	05	00	10.4100
1914	05	00	5.4800
1915	05	00	8.4100
1916	05	00	8.9300
1917	05	00	9.9100
1918	05	00	10.3200
1919	05	00	7.2800
1920	05	00	7.8700
1921	05	00	9.0300
1922	05	00	10.0300
1923	05	00	8.5200
1924	05	00	7.7400
1925	05	00	9.9100
1926	05	00	*MISSING*
1927	05	00	6.6000
1928	05	00	7.8500
1929	05	00	9.8100
1930	05	00	9.8600
1931	05	00	4.5100
1932	05	00	10.6900
1933	05	00	10.0100
1934	05	00	5.8000
1935	05	00	10.0700
1936	05	00	11.2300
1937	05	00	12.7200
1938	05	00	15.6700
1939	05	00	10.0200
1940	05	00	15.3600
1941	05	00	5.1600
1942	05	00	7.7000
1943	05	00	10.0400
1944	05	00	6.9400
1945	05	00	5.9300
1946	05	00	10.7300
1947	05	00	6.2900
1948	05	00	8.9200
1949	05	00	7.8000
1950	05	00	9.1300
1951	05	00	8.1900
1952	05	00	10.4600
1953	05	00	10.0300
1954	05	00	8.4100

Table C4 (continued)

FILE: HPRECJTA LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION JAN THRU APRIL PRECIPITATION
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1955	05	00	7.1600
1956	05	00	8.2100
1957	05	00	9.5600
1958	05	00	9.1700
1959	05	00	10.8500
1960	05	00	10.1700
1961	05	00	9.5300
1962	05	00	11.6300
1963	05	00	11.7700
1964	05	00	12.7800
1965	05	00	13.0100
1966	05	00	8.3100
1967	05	00	14.7100
1968	05	00	8.8900
1969	05	00	11.8000
1970	05	00	12.4000
1971	05	00	12.4000
1972	05	00	8.7200
1973	05	00	7.2700
1974	05	00	13.9700
1975	05	00	16.5900
1976	05	00	11.4800
1977	05	00	5.5100
1978	05	00	13.6800
1979	05	00	8.9700
1980	05	00	7.2800
1981	05	00	6.7100
1982	05	00	17.9000
1983	05	00	11.1000

THE MEAN IS	9.3828
THE MAXIMUM IS	17.9
THE MINIMUM IS	2.71
THE STANDARD DEVIATION IS	2.9756
THE COEFFICIENT OF VARIATION IS	.3171

HEBGEN DAM JANUARY THROUGH MAY PRECIPITATION

Table C5

RUN DATE 11/02/83 PAGE 1

FILE: HPRECJTM LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION JANUARY THRU MAY PRECIPITATION
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1904	06	00	*MISSING*
1905	06	00	5.2900
1906	06	00	*MISSING*
1907	06	00	7.5500
1908	06	00	*MISSING*
1909	06	00	*MISSING*
1910	06	00	*MISSING*
1911	06	00	7.0700
1912	06	00	6.4000
1913	06	00	12.7600
1914	06	00	6.8200
1915	06	00	13.5600
1916	06	00	11.7000
1917	06	00	11.6800
1918	06	00	11.9700
1919	06	00	9.0500
1920	06	00	11.0600
1921	06	00	13.5400
1922	06	00	12.2300
1923	06	00	10.4600
1924	06	00	8.7400
1925	06	00	12.2400
1926	06	00	*MISSING*
1927	06	00	10.2700
1928	06	00	8.3900
1929	06	00	11.0300
1930	06	00	11.1800
1931	06	00	6.0100
1932	06	00	12.6700
1933	06	00	12.2500
1934	06	00	5.9600
1935	06	00	12.4400
1936	06	00	12.2400
1937	06	00	13.1700
1938	06	00	18.9700
1939	06	00	11.6500
1940	06	00	16.6200
1941	06	00	9.1700
1942	06	00	11.9900
1943	06	00	12.7700
1944	06	00	9.7900
1945	06	00	10.2300
1946	06	00	13.2100
1947	06	00	8.4400
1948	06	00	11.4900
1949	06	00	10.3000
1950	06	00	10.3700
1951	06	00	10.5500
1952	06	00	12.5500
1953	06	00	15.9100
1954	06	00	9.1500

Table C5 (continued)

FILE: HPRECJTM LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION JANUARY THRU MAY PRECIPITATION
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1955	06	00	10.3200
1956	06	00	11.0800
1957	06	00	12.6200
1958	06	00	11.2600
1959	06	00	16.8700
1960	06	00	12.4900
1961	06	00	11.4400
1962	06	00	16.4000
1963	06	00	14.4900
1964	06	00	15.2200
1965	06	00	15.2800
1966	06	00	10.1700
1967	06	00	17.3000
1968	06	00	11.9400
1969	06	00	13.7000
1970	06	00	12.7000
1971	06	00	14.4700
1972	06	00	10.9700
1973	06	00	10.2400
1974	06	00	15.9400
1975	06	00	18.5500
1976	06	00	13.8100
1977	06	00	9.6000
1978	06	00	15.8300
1979	06	00	10.3600
1980	06	00	13.4800
1981	06	00	10.8900
1982	06	00	19.7200
1983	06	00	12.1700

THE MEAN IS	11.8945
THE MAXIMUM IS	19.72
THE MINIMUM IS	5.29
THE STANDARD DEVIATION IS	3.0246
THE COEFFICIENT OF VARIATION IS	.2543

YELLOWSTONE PARK MONTHLY PRECIPITATION

Table C6

MONTHLY PRECIPITATION

FILE -- YESTOPRE
SITE -- YELLOWSTONE PARK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1887	7.70	4.65	.65	1.40	.25	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	2.41	+#####.##
1888	3.93	2.02	3.12	.48	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+#####.##
1889	1.05	1.93	.53	.92	1.40	.66	.56	.64	.59	1.32	2.19	8.89	20.68
1890	6.70	6.65	4.92	1.39	2.00	.94	.99	1.77	.19	1.68	.49	.89	28.60
1891	.48	2.79	2.41	.18	2.12	3.05	3.15	1.22	1.74	1.44	2.00	2.77	23.34
1892	1.40	2.10	3.05	.92	2.06	1.46	.98	.64	1.60	.79	1.90	2.17	19.07
1893	1.82	.79	.96	.97	1.01	.38	.99	1.05	1.44	1.34	2.51	1.91	15.18
1894	1.82	1.12	2.30	1.87	2.26	3.10	.99	1.75	.71	.89	.15	1.34	18.30
1895	4.76	.34	2.70	.61	1.68	2.71	.57	.72	.43	.44	1.30	1.29	17.55
1896	2.21	2.07	2.62	1.29	3.85	.73	2.09	.37	1.10	.06	3.92	.46	20.76
1897	1.12	.80	1.06	1.21	1.55	2.34	1.11	.57	.31	1.72	2.98	.80	15.57
1898	.31	1.21	1.40	.95	1.95	2.67	1.15	2.05	.90	2.25	1.55	.67	17.06
1899	4.21	3.40	3.00	2.30	2.52	1.90	1.42	2.23	.90	2.02	.03	1.89	25.81
1900	.90	1.65	3.13	1.93	2.42	1.17	.80	.29	.87	1.22	1.17	1.17	16.72
1901	2.26	.72	1.46	1.08	2.72	1.43	.92	1.65	2.85	.92	1.25	2.53	19.79
1902	.96	.61	2.46	2.14	1.59	1.87	2.29	.61	.90	.20	2.35	.85	16.83
1903	.60	.25	.85	.80	.65	.90	.55	.45	.60	.52	1.40	.40	7.96
1904	.93	1.50	2.98	.96	1.31	1.03	1.11	1.11	.73	.67	.18	1.19	13.70
1905	.25	.60	1.41	1.52	2.46	3.05	1.38	.32	1.17	1.42	1.21	.19	14.98
1906	1.48	1.84	1.35	1.24	2.01	.91	.64	1.47	.62	1.07	.63	1.84	15.10
1907	2.44	.58	4.56	1.12	2.16	2.91	2.20	.90	1.19	.54	.81	.94	20.34
1908	.85	1.22	1.39	.88	3.38	3.30	.73	3.42	.74	3.00	.25	.48	19.63
1909	1.61	.65	.77	.81	.95	.75	1.85	.70	2.45	.34	1.16	1.27	13.31
1910	1.90	1.61	.82	1.19	2.34	.61	1.72	.52	.78	1.49	1.53	.88	15.39
1911	4.56	1.10	.95	1.40	2.19	2.20	.97	.66	1.11	1.17	2.33	1.01	19.65
1912	.89	.48	2.57	2.24	2.17	1.21	2.37	1.66	1.09	2.85	1.28	1.47	20.27
1913	2.60	.52	2.00	1.21	2.81	2.09	3.14	1.58	1.34	1.68	1.54	.25	20.76
1914	.97	.78	.66	1.49	1.14	2.48	.36	.20	1.95	1.35	.29	.07	11.74
1915	.41	.39	1.05	1.29	2.33	2.00	1.77	1.53	1.79	.34	1.15	.89	14.94
1916	2.60	.59	1.46	1.05	2.23	2.36	1.94	.70	.71	3.47	.69	2.47	20.27
1917	.69	1.83	1.90	2.64	1.97	.67	.41	.17	1.75	.97	.66	2.28	15.94
1918	1.98	2.03	1.89	1.59	1.95	2.97	2.14	.86	2.11	2.27	.66	.39	20.93
1919	.88	1.64	1.00	1.41	1.29	.14	.80	.40	2.51	2.69	.80	2.13	15.69
1920	.28	1.02	1.95	1.33	2.84	1.18	.65	.87	1.44	1.80	1.13	1.26	15.75
1921	1.49	.62	1.24	1.70	4.48	1.13	.93	1.03	.84	.56	2.55	2.25	18.32
1922	.74	1.84	.66	1.15	1.08	.56	1.45	1.60	.10	.34	.96	1.98	12.46
1923	1.49	.59	1.00	1.81	1.71	2.10	.95	.70	1.05	1.24	.48	1.22	14.34
1924	.80	.77	1.21	.95	.43	.81	3.39	1.36	1.67	2.43	2.23	1.46	17.50
1925	1.32	1.29	1.00	1.95	2.32	2.82	1.04	1.65	2.73	2.46	.94	.89	20.40
1926	.35	1.05	.56	1.38	2.19	1.19	.18	1.37	1.53	1.42	2.07	.83	14.12
1927	1.10	.86	.65	1.53	2.96	1.02	.42	2.21	2.36	1.53	3.74	1.18	19.56
1928	.70	.37	1.60	1.51	.51	2.99	1.30	.96	.03	1.57	.59	.84	12.97
1929	1.09	.77	1.03	1.48	1.04	1.26	1.21	1.37	1.17	1.27	.86	1.84	14.39
1930	.88	.69	1.10	.62	1.04	1.00	.86	4.13	1.36	2.39	1.11	.27	15.45
1931	.11	.25	.80	.95	1.61	1.27	.72	.75	1.30	.78	1.24	1.14	10.92
1932	.83	.70	1.23	1.06	1.59	2.10	1.09	.97	.47	1.01	.46	.80	12.41
1933	1.19	.76	.54	.91	1.15	1.05	.21	2.58	1.73	.83	.32	1.37	12.64
1934	.61	.24	.96	1.14	.42	3.48	.81	.68	.95	1.00	.56	1.12	11.97
1935	1.00	.48	1.41	2.07	1.31	.46	.52	.72	.55	.80	.77	.22	10.31
1936	1.31	1.60	.71	1.64	.61	1.54	2.00	1.62	.69	.67	.40	1.21	14.00

Table C6 (continued)

MONTHLY PRECIPITATION

FILE -- YESTOPRE
SITE -- YELLOWSTONE PARK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE

11/02/83

1937	.93	1.30	1.34	1.54	.75	2.35	2.42	.35	1.11	.52	.47	1.34	14.32
1938	1.41	.96	1.48	1.32	1.89	.83	1.35	1.07	.54	4.98	.63	.69	17.14
1939	1.21	.94	1.37	.88	.58	1.53	.36	.91	.36	1.05	0.00	.94	10.63
1940	.97	1.51	2.00	1.94	1.03	2.47	1.57	.44	2.84	.49	1.06	.49	16.81
1941	.28	.58	1.05	1.30	1.40	2.18	2.00	3.47	2.02	.97	1.46	1.32	18.02
1942	.39	.69	.40	1.09	4.25	1.23	.55	.42	1.23	.64	2.61	1.15	15.15
1943	3.43	.90	1.65	1.92	2.43	2.85	.25	.64	.70	1.83	.60	.58	17.77
1944	.33	1.42	1.24	.53	2.40	5.20	.94	.61	1.94	.89	1.67	.34	17.51
1945	.38	.56	1.12	.67	2.78	5.79	.59	2.48	1.92	.47	1.59	1.15	19.50
1946	1.13	.94	2.56	.36	2.29	1.02	1.71	.68	1.90	3.39	1.64	1.30	18.92
1947	.71	1.02	1.40	1.15	1.80	4.79	.76	2.14	2.73	.78	1.58	1.48	20.33
1948	1.54	1.21	1.46	1.17	1.52	1.47	.37	1.47	1.16	.30	1.89	2.01	16.07
1949	1.15	1.76	.86	.76	1.39	2.08	.50	.56	2.20	1.89	.81	1.03	14.99
1950	2.36	.65	1.60	1.77	1.32	1.78	3.14	.89	2.25	1.41	1.29	.83	19.29
1951	.99	.52	1.85	1.44	1.77	1.60	1.75	2.63	.45	2.55	.59	1.59	17.73
1952	1.48	.88	1.69	.31	2.21	2.28	2.16	1.75	.21	0.00	.45	.94	14.36
1953	1.12	1.22	.96	1.70	2.78	1.25	.56	.33	.55	.16	.47	1.44	12.54
1954	1.99	.80	1.43	1.92	1.30	3.62	.90	.95	.44	.58	.55	1.05	15.53
1955	.65	.77	1.71	.57	2.14	2.33	1.36	.62	.92	1.34	2.51	4.06	18.98
1956	1.44	1.23	.70	2.77	1.49	1.57	1.15	1.18	.39	.87	.74	1.39	14.92
1957	1.23	.94	1.30	1.44	2.47	1.36	1.47	1.48	.61	.72	1.07	.84	14.93
1958	.36	.50	1.37	2.32	1.93	3.65	1.22	2.28	1.25	.60	1.40	.80	17.68
1959	1.06	1.64	.70	1.53	2.62	2.68	.72	.69	1.26	1.02	.61	.35	14.98
1960	.53	.83	.69	1.99	1.80	1.30	.25	1.68	.20	.57	1.78	.45	12.07
1961	.09	1.26	.72	.96	.90	.43	1.23	2.16	3.66	1.99	1.06	1.09	15.55
1962	2.03	1.78	.87	.70	2.19	2.00	1.92	1.03	1.19	.48	2.02	.59	16.80
1963	1.70	.84	1.12	1.75	2.92	2.85	.55	1.31	3.01	.72	1.27	.52	18.56
1964	1.48	.62	1.01	1.69	1.14	3.32	1.13	1.31	.14	1.68	1.00	3.20	17.72
1965	1.49	.80	.85	.95	1.86	2.85	1.79	1.04	1.52	.27	.90	1.00	15.32
1966	.90	.35	.70	1.10	1.56	1.83	.38	.87	####.##	####.##	####.##	####.##	######.##
1967	1.29	1.00	1.66	1.35	1.92	2.57	1.86	.34	.65	2.53	1.27	1.91	18.34
1968	3.81	.29	.33	.75	1.93	3.96	.39	3.87	2.07	1.24	1.09	.53	20.25
1969	3.46	1.60	.12	.63	1.23	2.84	1.14	1.07	1.18	1.18	.46	1.13	16.04
1970	1.06	.36	1.29	.92	1.97	1.94	1.49	.69	1.37	.55	2.23	1.52	15.29
1971	1.44	1.12	.59	1.19	1.21	1.52	.73	1.62	1.55	.65	1.21	1.45	14.28
1972	3.24	.78	.80	1.71	1.56	2.64	1.47	2.24	3.17	1.68	.29	.70	20.28
1973	.25	.39	.26	.93	2.01	1.39	1.31	1.59	2.01	.68	1.91	.41	13.14
1974	.74	.40	3.05	.28	2.31	.84	.30	1.75	.17	.74	.30	1.04	12.52
1975	1.04	.52	1.52	1.76	1.34	1.44	1.75	.85	.54	1.57	1.25	.87	14.45
1976	.21	.53	1.31	.79	2.68	3.83	1.83	2.02	2.47	.80	.41	.12	16.39
1977	.71	.16	.35	.13	2.10	1.61	####.##	####.##	####.##	.24	####.##	####.##	######.##
1978	1.52	1.84	.70	.97	2.12	1.04	1.17	.62	1.14	.28	1.14	1.91	14.45
1979	1.19	.48	2.41	.07	.12	1.13	1.31	2.35	.05	1.09	.54	.34	11.08
1980	1.23	1.09	.92	.41	3.03	1.35	1.80	2.66	1.77	.49	1.16	.66	16.57
1981	.05	.36	.41	.60	3.35	2.47	####.##	####.##	####.##	1.62	1.25	1.56	######.##
1982	1.61	1.03	1.94	2.11	1.48	2.20	1.39	4.21	1.44	####.##	1.08	.67	######.##
1983	.19	.49	1.08	.27	.57	1.70	####.##	####.##	####.##	####.##	####.##	####.##	######.##
MEAN	1.45	1.09	1.41	1.23	1.85	1.94	1.24	1.30	1.26	1.22	1.19	1.25	16.46
S.D.	1.29	.89	.86	.56	.82	1.07	.69	.87	.80	.86	.77	1.06	3.39
COEF. VAR.	.889	.818	.607	.455	.445	.553	.560	.672	.633	.703	.648	.849	.205

PERCENT OF

Table C6 (continued)

MONTHLY PRECIPITATION

FILE -- YESTOPRE
SITE -- YELLOWSTONE PARK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE

11/02/83

ANNUAL MEAN	8.8%	6.6%	3.6%	7.5%	11.2%	11.8%	7.5%	7.9%	7.7%	7.4%	7.3%	7.6%

SUM OF MONTHLY MEANS 16.5

LICK CREEK STATION MONTHLY PRECIPITATION

Table C7

PRECIPITATION

FILE -- LCPRECCR
SITE -- LICK CREEK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ****.** INDICATES NO DATA AVAILABLE

04/12/84

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1964	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	*****.**	.25	3.14	2.56	******.**
1965	4.97	2.53	2.28	3.48	6.94	4.37	2.30	1.83	3.36	.92	1.30	.93	35.30
1966	2.08	1.84	2.38	3.93	4.03	3.82	1.07	3.83	1.33	2.17	1.72	2.23	31.14
1967	3.37	4.73	4.47	2.56	3.59	2.33	2.34	.41	2.01	4.83	3.11	6.35	40.54
1968	2.00	2.66	2.27	4.83	5.80	4.88	1.39	3.97	3.90	1.93	3.28	1.37	38.08
1969	3.26	.66	1.73	5.61	3.89	7.69	1.92	1.73	1.67	5.47	1.34	3.74	38.75
1970	2.45	1.83	5.25	9.53	5.48	2.22	3.46	1.21	3.24	3.52	3.58	1.80	44.56
1971	4.50	4.95	4.58	5.56	4.33	3.11	.53	2.13	3.03	1.70	2.35	1.67	33.54
1972	2.25	1.84	3.70	2.84	2.44	3.80	.96	2.16	3.70	3.27	1.58	1.99	30.52
1973	1.98	1.00	4.27	8.24	1.35	5.34	1.26	2.95	2.60	3.05	1.51	3.15	37.19
1974	2.21	1.91	4.75	6.25	5.47	2.08	1.18	3.10	1.69	2.00	2.19	2.85	35.67
1975	3.03	1.85	4.03	4.17	7.89	5.03	1.64	2.95	1.67	5.08	3.24	3.09	43.66
1976	2.53	2.03	2.31	5.98	2.37	5.58	1.56	1.02	2.03	2.05	2.53	1.32	31.30
1977	2.04	1.55	5.93	1.91	5.87	2.60	1.38	3.29	2.99	2.87	4.46	3.26	33.15
1978	2.94	2.50	2.36	2.59	7.05	2.36	2.13	.31	4.18	1.80	2.42	3.50	34.13
1979	1.70	1.70	2.10	2.60	4.10	3.70	1.20	2.60	.20	2.25	2.24	2.01	26.39
1980	2.98	3.84	4.55	3.00	6.06	4.29	1.13	.43	3.74	2.75	2.44	4.19	39.54
1981	1.86	3.44	2.10	2.40	8.70	5.60	.30	.80	.70	3.30	2.40	3.40	34.99
1982	2.70	1.60	4.40	4.30	3.70	5.00	1.00	1.90	4.30	1.90	2.80	3.10	36.69
MEAN	2.74	2.36	3.61	4.43	5.00	4.09	1.46	2.04	2.60	2.69	2.54	2.76	36.50
S.D.	.91	1.18	1.39	2.10	1.92	1.50	.74	1.17	1.24	1.35	.84	1.25	4.54
COEF. VAR.	.335	.499	.384	.475	.384	.367	.507	.573	.477	.503	.331	.452	.127
PERCENT OF ANNUAL MEAN	7.5%	6.5%	9.9%	12.2%	13.7%	11.3%	4.0%	5.6%	7.2%	7.4%	7.0%	7.6%	
SUM OF MONTHLY MEANS													36.4

SHOWER FALLS STATION MONTHLY PRECIPITATION

Table C8

PRECIPITATION

FILE -- SFPRECCR
SITE -- SHOWER FALLS
UNIT -- INCHES
NOTE -- ANY MONTH WITH ****.** INDICATES NO DATA AVAILABLE

04/12/84

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1964	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	******.**
1965	****.**	****.**	****.**	****.**	****.**	****.**	****.**	****.**	3.00	1.10	2.10	2.40	******.**
1966	3.95	4.71	4.94	6.23	3.64	4.87	2.43	1.82	2.11	2.53	3.02	2.21	42.50
1967	3.23	5.82	5.65	3.85	4.14	8.65	4.31	.48	2.60	6.35	4.25	9.44	64.26
1968	3.50	4.22	3.46	6.55	8.08	5.36	2.30	6.70	4.49	1.93	5.43	2.94	54.35
1969	7.06	2.24	2.16	5.30	5.34	8.85	1.84	1.00	4.35	6.63	4.10	4.52	53.38
1970	7.51	4.40	7.70	9.10	7.10	3.24	4.12	1.00	4.63	4.60	5.37	2.69	61.45
1971	5.43	6.94	7.42	5.60	7.36	3.23	.43	2.53	3.75	3.03	5.21	4.42	55.39
1972	5.37	5.51	7.99	5.10	3.25	4.73	2.73	1.53	4.86	8.55	2.25	3.35	55.21
1973	2.75	2.40	6.30	9.60	4.04	6.16	3.18	3.52	4.05	3.98	4.29	5.09	55.05
1974	4.70	4.35	7.04	8.21	6.94	3.68	.94	3.30	1.33	3.15	3.22	5.30	52.16
1975	7.61	3.60	5.36	6.41	10.14	6.83	2.25	2.53	2.77	6.10	5.59	5.27	66.00
1976	5.08	3.64	5.09	8.18	2.48	6.93	3.49	2.24	3.91	2.90	1.95	3.09	48.97
1977	3.37	3.04	8.16	2.75	6.70	3.64	2.52	1.26	6.28	5.85	4.32	6.58	54.36
1978	5.00	4.01	4.19	6.80	9.72	3.30	3.45	1.20	7.05	1.49	3.72	5.62	56.54
1979	3.30	3.82	3.92	6.42	4.78	6.02	2.24	3.31	.24	3.34	3.42	2.26	43.06
1980	3.82	3.86	5.34	3.07	3.34	5.68	2.17	3.34	5.52	2.90	2.70	2.84	51.08
1981	1.50	4.13	3.78	5.10	10.20	9.30	1.30	1.40	1.30	4.90	3.10	5.20	51.30
1982	4.30	2.70	7.80	6.50	4.30	4.30	3.40	2.00	5.00	3.40	2.70	4.60	52.09
MEAN	4.37	4.08	5.79	6.16	5.32	5.57	2.56	2.30	4.07	4.04	3.76	4.32	54.14
S.D.	1.36	1.21	1.83	1.92	2.49	2.00	1.11	1.47	2.00	1.99	1.27	1.84	6.21
COEF. VAR.	.374	.297	.316	.312	.394	.359	.435	.639	.493	.493	.338	.427	.114
PERCENT OF ANNUAL MEAN	8.2%	7.6%	10.7%	11.4%	11.7%	10.3%	4.8%	4.3%	7.5%	7.5%	7.0%	8.0%	
SUM OF MONTHLY MEANS													54.0

Table C9

Prediction Equations for Temperature Extensions

Date of Interest	Equation[1/]	Coef. of Correlation	Coef. of Determination	Standard Error of Estimate	Total Common Data Points
May 1	$Y=0.205x^{1.341}$	0.71	0.51	0.21	8
May 15	$Y=1.958x^{0.772}$	0.77	0.59	0.12	10
June 1	$Y=1.569x^{0.819}$	0.51	0.26	0.14	10
June 15	$Y=0.516x^{1.106}$	0.78	0.61	0.11	11

Notes:

1/ Y variable is the Shower Falls value and X variable is the Hebgen Dam value.

"EXTENDED" MEAN DAILY TEMPERATURES

FOR SHOWERS FALLS

. May 1

. May 15

. June 1

. June 15

Table C10

RUN DATE 11/02/83 PAGE 1

FILE: S51MEATE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1913	05	01	20.5437
1914	05	01	35.3850
1915	05	01	27.4705
1916	05	01	24.1746
1917	05	01	17.9226
1918	05	01	34.3583
1919	05	01	30.3785
1920	05	01	25.5740
1921	05	01	38.4796
1922	05	01	25.5740
1923	05	01	20.5437
1924	05	01	31.8600
1925	05	01	31.8600
1926	05	01	37.9592
1927	05	01	35.8961
1928	05	01	29.4009
1929	05	01	20.9893
1930	05	01	39.0017
1931	05	01	34.8757
1932	05	01	28.4316
1933	05	01	25.1053
1934	05	01	36.4092
1935	05	01	21.4373
1936	05	01	31.3542
1937	05	01	29.4009
1938	05	01	35.8961
1939	05	01	33.8628
1940	05	01	33.8628
1941	05	01	36.4092
1942	05	01	25.5740
1943	05	01	36.9240
1944	05	01	27.4705
1945	05	01	31.8600
1946	05	01	22.3404
1947	05	01	30.8703
1948	05	01	24.1746
1949	05	01	22.7955
1950	05	01	18.7862
1951	05	01	20.1005
1952	05	01	35.3850
1953	05	01	22.3404
1954	05	01	12.5766
1955	05	01	30.3785
1956	05	01	26.0449
1957	05	01	33.8628
1958	05	01	25.1053
1959	05	01	32.3578
1960	05	01	26.5179
1961	05	01	31.8600
1962	05	01	27.4705
1963	05	01	32.8575

Table C10 (continued)

FILE: S51MEATE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1964	05	01	27.4705
1965	05	01	30.8703
1966	05	01	39.0000
1967	05	01	15.8100
1968	05	01	34.8757
1969	05	01	21.4373
1970	05	01	17.9226
1971	05	01	30.8703
1972	05	01	20.1006
1973	05	01	18.5000
1974	05	01	33.3592
1975	05	01	18.7862
1976	05	01	30.8703
1977	05	01	42.5000
1978	05	01	28.9152
1979	05	01	29.2000
1980	05	01	31.6000
1981	05	01	34.7000
1982	05	01	45.0000
1983	05	01	30.0000

THE MEAN IS	28.9279
THE MAXIMUM IS	45
THE MINIMUM IS	12.5766
THE STANDARD DEVIATION IS	6.7322
THE COEFFICIENT OF VARIATION IS	.2345

Table C11

RUN DATE 11/02/83 PAGE 3

FILE: S515METE LIBRARY: A249ATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1913	05	15	35.1467
1914	05	15	42.0656
1915	05	15	32.8619
1916	05	15	29.5135
1917	05	15	34.1730
1918	05	15	41.1429
1919	05	15	42.3713
1920	05	15	35.7914
1921	05	15	38.3371
1922	05	15	35.7914
1923	05	15	34.4985
1924	05	15	42.0656
1925	05	15	37.0707
1926	05	15	40.5244
1927	05	15	41.4512
1928	05	15	38.3371
1929	05	15	33.5193
1930	05	15	36.4327
1931	05	15	42.0656
1932	05	15	34.1730
1933	05	15	34.4985
1934	05	15	42.0656
1935	05	15	36.4327
1936	05	15	47.1878
1937	05	15	38.0217
1938	05	15	39.2789
1939	05	15	43.5903
1940	05	15	40.8340
1941	05	15	36.1125
1942	05	15	31.8684
1943	05	15	32.2006
1944	05	15	42.6774
1945	05	15	33.5193
1946	05	15	34.8230
1947	05	15	35.7914
1948	05	15	34.8230
1949	05	15	42.0656
1950	05	15	39.2789
1951	05	15	37.0707
1952	05	15	35.7914
1953	05	15	36.4327
1954	05	15	42.3718
1955	05	15	30.5293
1956	05	15	36.1125
1957	05	15	35.7914
1958	05	15	38.0217
1959	05	15	41.4512
1960	05	15	37.3385
1961	05	15	36.4327
1962	05	15	31.8684
1963	05	15	36.4327

Table C11 (continued)

FILE: S51SMETE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1964	05	15	38.9657
1965	05	15	36.7521
1966	05	15	34.0000
1967	05	15	36.1125
1968	05	15	30.5293
1969	05	15	40.8340
1970	05	15	35.1467
1971	05	15	37.3885
1972	05	15	48.0000
1973	05	15	41.0000
1974	05	15	25.5000
1975	05	15	38.9657
1976	05	15	35.4695
1977	05	15	38.8000
1978	05	15	43.8334
1979	05	15	38.0000
1980	05	15	36.5000
1981	05	15	36.5000
1982	05	15	31.5000
1983	05	15	30.9000

THE MEAN IS	37.2234
THE MAXIMUM IS	48
THE MINIMUM IS	25.5
THE STANDARD DEVIATION IS	4.1369
THE COEFFICIENT OF VARIATION IS	.1111

Table C12

RUN DATE 11/02/83 PAGE 5

FILE: S61MEATE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1913	06	01	43.0910
1914	06	01	45.2473
1915	06	01	38.3870
1916	06	01	32.5569
1917	06	01	35.8262
1918	06	01	28.8961
1919	06	01	31.9065
1920	06	01	30.5767
1921	06	01	36.1484
1922	06	01	37.4313
1923	06	01	31.2432
1924	06	01	38.3870
1925	06	01	36.1484
1926	06	01	39.9685
1927	06	01	31.5752
1928	06	01	36.4701
1929	06	01	39.0213
1930	06	01	33.2243
1931	06	01	40.9107
1932	06	01	34.8555
1933	06	01	41.2237
1934	06	01	39.0213
1935	06	01	37.1115
1936	06	01	41.8482
1937	06	01	35.5033
1938	06	01	39.6533
1939	06	01	38.0690
1940	06	01	44.3260
1941	06	01	36.1484
1942	06	01	37.4313
1943	06	01	33.8789
1944	06	01	39.9685
1945	06	01	37.4313
1946	06	01	35.1797
1947	06	01	37.1115
1948	06	01	46.7736
1949	06	01	34.5307
1950	06	01	36.4701
1951	06	01	29.9069
1952	06	01	41.8482
1953	06	01	38.3870
1954	06	01	31.9065
1955	06	01	29.2339
1956	06	01	44.3260
1957	06	01	40.9107
1958	06	01	37.4313
1959	06	01	36.4701
1960	06	01	40.2331
1961	06	01	41.5362
1962	06	01	38.3870
1963	06	01	41.2237

Table C12 (continued)

FILE: S61MEATE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1964	06	01	36.7911
1965	06	01	37.4313
1966	06	01	46.5000
1967	06	01	38.7044
1968	06	01	38.0690
1969	06	01	35.5033
1970	06	01	36.4701
1971	06	01	33.2243
1972	06	01	47.5000
1973	06	01	32.5000
1974	06	01	37.0000
1975	06	01	39.3376
1976	06	01	37.0000
1977	06	01	42.4706
1978	06	01	35.5033
1979	06	01	31.0000
1980	06	01	40.5000
1981	06	01	38.2000
1982	06	01	30.5000
1983	06	01	41.6000

THE MEAN IS	37.482
THE MAXIMUM IS	47.5
THE MINIMUM IS	28.89614
THE STANDARD DEVIATION IS	4.2551
THE COEFFICIENT OF VARIATION IS	.1135

Table C13

RUN DATE 11/02/83 PAGE 7

FILE: S615METE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1913	06	15	44.6983
1914	06	15	42.0818
1915	06	15	47.7705
1916	06	15	43.8248
1917	06	15	44.6988
1918	06	15	50.8513
1919	06	15	48.6517
1920	06	15	45.1364
1921	06	15	44.2616
1922	06	15	41.6471
1923	06	15	46.0129
1924	06	15	46.4517
1925	06	15	38.6167
1926	06	15	33.0499
1927	06	15	40.3457
1928	06	15	36.4659
1929	06	15	44.2616
1930	06	15	41.6471
1931	06	15	49.9764
1932	06	15	45.5744
1933	06	15	50.8613
1934	06	15	42.5169
1935	06	15	42.9524
1936	06	15	51.3044
1937	06	15	42.5169
1938	06	15	39.9128
1939	06	15	42.5169
1940	06	15	49.5344
1941	06	15	44.2616
1942	06	15	37.7550
1943	06	15	36.0371
1944	06	15	41.6471
1945	06	15	31.3543
1946	06	15	46.4517
1947	06	15	39.0483
1948	06	15	44.2616
1949	06	15	44.6988
1950	06	15	41.6471
1951	06	15	46.4517
1952	06	15	44.6988
1953	06	15	42.9524
1954	06	15	37.3248
1955	06	15	42.5169
1956	06	15	45.5744
1957	06	15	30.5098
1958	06	15	41.2129
1959	06	15	49.0329
1960	06	15	42.0818
1961	06	15	44.2616
1962	06	15	40.3457
1963	06	15	49.5344

Table C13 (continued)

FILE: S615METE LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MEAN TEMPERATURE
DATA UNITS: DEGRESS F

YEAR	MONTH	DAY	DATA
1964	06	15	42.5169
1965	06	15	37.7550
1966	06	15	48.0000
1967	06	15	41.6471
1968	06	15	37.7550
1969	06	15	38.1856
1970	06	15	36.0371
1971	06	15	37.7550
1972	06	15	46.5300
1973	06	15	31.5000
1974	06	15	48.5000
1975	06	15	43.3884
1976	06	15	34.5000
1977	06	15	40.3457
1978	06	15	43.2000
1979	06	15	39.3000
1980	06	15	31.2000
1981	06	15	33.0000
1982	06	15	45.5000
1983	06	15	43.4000

THE MEAN IS ----------	42.2797
THE MAXIMUM IS ----------	51.30441
THE MINIMUM IS ----------	30.50981
THE STANDARD DEVIATION IS -------	5.0319
THE COEFFICIENT OF VARIATION IS -	.119

HEBGEN DAM

MEAN DAILY SEQUENTIAL TEMPERATURES

FOR MAY AND JUNE

(1970-83)

Table C14

FILE: HOMEAN70 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1970	05	01	28.0000
1970	05	02	35.5000
1970	05	03	40.0000
1970	05	04	42.5000
1970	05	05	45.5000
1970	05	06	43.0000
1970	05	07	46.0000
1970	05	08	41.0000
1970	05	09	41.0000
1970	05	10	39.5000
1970	05	11	30.5000
1970	05	12	32.5000
1970	05	13	30.0000
1970	05	14	35.5000
1970	05	15	42.0000
1970	05	16	45.0000
1970	05	17	51.5000
1970	05	18	53.0000
1970	05	19	51.0000
1970	05	20	51.0000
1970	05	21	46.5000
1970	05	22	46.0000
1970	05	23	49.0000
1970	05	24	47.5000
1970	05	25	50.5000
1970	05	26	53.0000
1970	05	27	47.5000
1970	05	28	42.0000
1970	05	29	43.5000
1970	05	30	45.0000
1970	05	31	44.0000
1970	06	01	46.5000
1970	06	02	54.5000
1970	06	03	57.0000
1970	06	04	59.0000
1970	06	05	57.5000
1970	06	06	59.5000
1970	06	07	55.0000
1970	06	08	58.5000
1970	06	09	54.0000
1970	06	10	48.0000
1970	06	11	41.6000
1970	06	12	44.0000
1970	06	13	38.0000
1970	06	14	48.0000
1970	06	15	46.5000
1970	06	16	47.0000
1970	06	17	50.5000
1970	06	18	53.5000
1970	06	19	56.5000
1970	06	20	59.0000

Table C14 (continued)

FILE: HOMEAN70 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1970	06	21	56.0000
1970	06	22	57.5000
1970	06	23	63.0000
1970	06	24	63.5000
1970	06	25	64.0000
1970	06	26	64.0000
1970	06	27	69.5000
1970	06	28	59.0000
1970	06	29	56.5000
1970	06	30	42.5000

THE MEAN IS	48.6574
THE MAXIMUM IS	69.5
THE MINIMUM IS	28
THE STANDARD DEVIATION IS	9.0814
THE COEFFICIENT OF VARIATION IS	.1866

Table C15

FILE: HDMEAN71 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1971	05	01	42.0000
1971	05	02	42.5000
1971	05	03	48.5000
1971	05	04	49.0000
1971	05	05	44.5000
1971	05	06	44.5000
1971	05	07	42.0000
1971	05	08	42.5000
1971	05	09	42.5000
1971	05	10	43.0000
1971	05	11	44.5000
1971	05	12	45.5000
1971	05	13	49.0000
1971	05	14	42.0000
1971	05	15	45.5000
1971	05	16	47.5000
1971	05	17	31.0000
1971	05	18	37.0000
1971	05	19	39.5000
1971	05	20	38.5000
1971	05	21	41.0000
1971	05	22	38.5000
1971	05	23	42.5000
1971	05	24	47.0000
1971	05	25	49.5000
1971	05	26	57.0000
1971	05	27	55.5000
1971	05	28	58.5000
1971	05	29	57.5000
1971	05	30	46.5000
1971	05	31	42.0000
1971	06	01	42.0000
1971	06	02	44.5000
1971	06	03	42.5000
1971	06	04	48.0000
1971	06	05	46.5000
1971	06	06	49.5000
1971	06	07	50.0000
1971	06	08	50.0000
1971	06	09	53.0000
1971	06	10	53.5000
1971	06	11	48.5000
1971	06	12	52.0000
1971	06	13	53.0000
1971	06	14	53.5000
1971	06	15	48.5000
1971	06	16	55.0000
1971	06	17	52.5000
1971	06	18	55.5000
1971	06	19	57.0000
1971	06	20	57.0000

Table C15 (continued)

FILE: HDMEAN71 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1971	06	21	61.5000
1971	06	22	63.0000
1971	06	23	63.5000
1971	06	24	62.5000
1971	06	25	59.5000
1971	06	26	60.0000
1971	06	27	45.0000
1971	06	28	42.0000
1971	06	29	45.0000
1971	06	30	48.5000

THE MEAN IS	49.5082
THE MAXIMUM IS	63.5
THE MINIMUM IS	31
THE STANDARD DEVIATION IS	7.1586
THE COEFFICIENT OF VARIATION IS	.1476

Table C16

FILE: HDMEAN72 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1972	05	01	30.5000
1972	05	02	34.5000
1972	05	03	43.5000
1972	05	04	43.5000
1972	05	05	41.5000
1972	05	06	45.5000
1972	05	07	39.5000
1972	05	08	40.5000
1972	05	09	39.0000
1972	05	10	42.5000
1972	05	11	39.5000
1972	05	12	39.0000
1972	05	13	47.0000
1972	05	14	49.5000
1972	05	15	50.5000
1972	05	16	53.5000
1972	05	17	54.5000
1972	05	18	51.5000
1972	05	19	51.0000
1972	05	20	53.5000
1972	05	21	43.5000
1972	05	22	39.5000
1972	05	23	40.5000
1972	05	24	45.5000
1972	05	25	43.5000
1972	05	26	43.5000
1972	05	27	49.5000
1972	05	28	50.0000
1972	05	29	52.0000
1972	05	30	50.5000
1972	05	31	56.5000
1972	06	01	55.0000
1972	06	02	51.5000
1972	06	03	51.5000
1972	06	04	54.5000
1972	06	05	56.5000
1972	06	06	59.0000
1972	06	07	58.0000
1972	06	08	55.0000
1972	06	09	55.0000
1972	06	10	55.5000
1972	06	11	53.5000
1972	06	12	49.0000
1972	06	13	51.0000
1972	06	14	54.0000
1972	06	15	55.0000
1972	06	16	57.5000
1972	06	17	60.0000
1972	06	18	56.5000
1972	06	19	48.0000
1972	06	20	49.5000

Table C16 (continued)

FILE: HOMEAN72 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1972	06	21	53.5000
1972	06	22	54.0000
1972	06	23	60.0000
1972	06	24	48.5000
1972	06	25	46.5000
1972	06	26	49.5000
1972	06	27	51.5000
1972	06	28	57.5000
1972	06	29	60.5000
1972	06	30	59.5000

THE MEAN IS	49.6885
THE MAXIMUM IS	60.5
THE MINIMUM IS	30.5
THE STANDARD DEVIATION IS	6.8673
THE COEFFICIENT OF VARIATION IS	.1382

Table C17

FILE: HOMEAN73 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1973	05	01	32.5000
1973	05	02	32.5000
1973	05	03	37.5000
1973	05	04	40.0000
1973	05	05	39.5000
1973	05	06	42.0000
1973	05	07	46.0000
1973	05	08	44.5000
1973	05	09	40.5000
1973	05	10	40.0000
1973	05	11	36.5000
1973	05	12	44.0000
1973	05	13	46.5000
1973	05	14	46.0000
1973	05	15	50.5000
1973	05	16	52.5000
1973	05	17	53.5000
1973	05	18	49.5000
1973	05	19	51.5000
1973	05	20	50.0000
1973	05	21	43.0000
1973	05	22	46.0000
1973	05	23	50.0000
1973	05	24	51.5000
1973	05	25	48.5000
1973	05	26	34.5000
1973	05	27	38.5000
1973	05	28	43.0000
1973	05	29	43.5000
1973	05	30	46.0000
1973	05	31	51.5000
1973	06	01	54.5000
1973	06	02	33.0000
1973	06	03	37.5000
1973	06	04	42.5000
1973	06	05	51.0000
1973	06	06	54.0000
1973	06	07	56.0000
1973	06	08	58.5000
1973	06	09	59.5000
1973	06	10	60.5000
1973	06	11	54.0000
1973	06	12	57.0000
1973	06	13	58.0000
1973	06	14	60.0000
1973	06	15	43.0000
1973	06	16	43.5000
1973	06	17	41.0000
1973	06	18	38.5000
1973	06	19	44.5000
1973	06	20	51.5000

Table C17 (continued)

FILE: HOMEAN73 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1973	06	21	56.5000
1973	06	22	50.0000
1973	06	23	57.5000
1973	06	24	57.0000
1973	06	25	62.0000
1973	06	26	63.0000
1973	06	27	62.5000
1973	06	28	62.0000
1973	06	29	60.5000
1973	06	30	60.0000

THE MEAN IS ---------- 48.7787
THE MAXIMUM IS ---------- 63
THE MINIMUM IS ---------- 32.5
THE STANDARD DEVIATION IS ------- 8.512
THE COEFFICIENT OF VARIATION IS - .1745

Table C18

FILE: HOMEAN74 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1974	05	01	44.5000
1974	05	02	40.0000
1974	05	03	39.0000
1974	05	04	42.5000
1974	05	05	43.5000
1974	05	06	43.0000
1974	05	07	45.0000
1974	05	08	46.0000
1974	05	09	48.0000
1974	05	10	47.0000
1974	05	11	40.0000
1974	05	12	42.5000
1974	05	13	38.0000
1974	05	14	32.5000
1974	05	15	32.5000
1974	05	16	31.5000
1974	05	17	39.0000
1974	05	18	43.0000
1974	05	19	45.0000
1974	05	20	35.5000
1974	05	21	35.0000
1974	05	22	41.5000
1974	05	23	43.0000
1974	05	24	48.5000
1974	05	25	50.0000
1974	05	26	52.5000
1974	05	27	54.0000
1974	05	28	51.0000
1974	05	29	51.0000
1974	05	30	42.5000
1974	05	31	41.5000
1974	06	01	46.0000
1974	06	02	50.5000
1974	06	03	52.0000
1974	06	04	51.0000
1974	06	05	46.5000
1974	06	06	43.0000
1974	06	07	43.5000
1974	06	08	45.5000
1974	06	09	49.0000
1974	06	10	51.0000
1974	06	11	54.5000
1974	06	12	59.5000
1974	06	13	59.5000
1974	06	14	63.0000
1974	06	15	64.5000
1974	06	16	69.0000
1974	06	17	63.5000
1974	06	18	60.5000
1974	06	19	63.0000
1974	06	20	64.5000

Table C18 (continued)

FILE: HDMEAN74 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1974	06	21	56.5000
1974	06	22	57.0000
1974	06	23	61.0000
1974	06	24	63.0000
1974	06	25	53.0000
1974	06	26	63.0000
1974	06	27	56.0000
1974	06	28	60.0000
1974	06	29	61.5000
1974	06	30	60.0000

THE MEAN IS	49.6557
THE MAXIMUM IS	69
THE MINIMUM IS	31.5
THE STANDARD DEVIATION IS	9.5344
THE COEFFICIENT OF VARIATION IS	.192

Table C19

FILE: HDMEAN75 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1975	05	01	29.0000
1975	05	02	31.5000
1975	05	03	38.0000
1975	05	04	39.5000
1975	05	05	33.0000
1975	05	06	39.5000
1975	05	07	35.5000
1975	05	08	38.5000
1975	05	09	35.5000
1975	05	10	41.5000
1975	05	11	40.5000
1975	05	12	40.5000
1975	05	13	41.5000
1975	05	14	46.5000
1975	05	15	48.0000
1975	05	16	50.0000
1975	05	17	45.5000
1975	05	18	46.0000
1975	05	19	43.0000
1975	05	20	32.5000
1975	05	21	35.0000
1975	05	22	36.0000
1975	05	23	36.5000
1975	05	24	37.5000
1975	05	25	32.0000
1975	05	26	35.0000
1975	05	27	42.0000
1975	05	28	44.0000
1975	05	29	45.5000
1975	05	30	47.5000
1975	05	31	49.0000
1975	06	01	51.0000
1975	06	02	53.0000
1975	06	03	51.0000
1975	06	04	46.5000
1975	06	05	52.0000
1975	06	06	53.5000
1975	06	07	53.0000
1975	06	08	52.0000
1975	06	09	43.0000
1975	06	10	44.0000
1975	06	11	48.0000
1975	06	12	53.0000
1975	06	13	53.5000
1975	06	14	54.0000
1975	06	15	55.0000
1975	06	16	49.5000
1975	06	17	47.0000
1975	06	18	45.0000
1975	06	19	38.0000
1975	06	20	43.5000

Table C19 (continued)

FILE: HDMEAN75 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1975	06	21	47.0000
1975	06	22	51.5000
1975	06	23	50.5000
1975	06	24	53.5000
1975	06	25	53.0000
1975	06	26	44.5000
1975	06	27	49.0000
1975	06	28	47.5000
1975	06	29	53.5000
1975	06	30	58.0000

THE MEAN IS	44.7377
THE MAXIMUM IS	58
THE MINIMUM IS	29
THE STANDARD DEVIATION IS	7.1178
THE COEFFICIENT OF VARIATION IS	.1591

Table C20

FILE: HDMEAN76 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURES
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1976	05	01	42.0000
1976	05	02	42.5000
1976	05	03	46.0000
1976	05	04	44.5000
1976	05	05	41.0000
1976	05	06	44.5000
1976	05	07	44.5000
1976	05	08	45.5000
1976	05	09	45.5000
1976	05	10	44.5000
1976	05	11	45.0000
1976	05	12	46.0000
1976	05	13	46.0000
1976	05	14	48.5000
1976	05	15	42.5000
1976	05	16	43.0000
1976	05	17	50.0000
1976	05	18	55.0000
1976	05	19	54.0000
1976	05	20	53.0000
1976	05	21	49.0000
1976	05	22	54.5000
1976	05	23	50.0000
1976	05	24	46.0000
1976	05	25	48.0000
1976	05	26	45.5000
1976	05	27	51.0000
1976	05	28	53.0000
1976	05	29	48.0000
1976	05	30	49.0000
1976	05	31	52.5000
1976	06	01	50.0000
1976	06	02	52.5000
1976	06	03	57.0000
1976	06	04	55.0000
1976	06	05	55.5000
1976	06	06	57.0000
1976	06	07	57.5000
1976	06	08	59.0000
1976	06	09	56.5000
1976	06	10	56.5000
1976	06	11	55.5000
1976	06	12	44.0000
1976	06	13	37.0000
1976	06	14	37.5000
1976	06	15	43.0000
1976	06	16	53.5000
1976	06	17	48.0000
1976	06	18	45.5000
1976	06	19	54.0000
1976	06	20	50.0000

Table C20 (continued)

FILE: HOMEAN76 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURES
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1976	06	21	57.0000
1976	06	22	59.5000
1976	06	23	44.5000
1976	06	24	46.5000
1976	06	25	49.0000
1976	06	26	46.5000
1976	06	27	53.5000
1976	06	28	56.5000
1976	06	29	65.5000
1976	06	30	64.5000

THE MEAN IS	49.959
THE MAXIMUM IS	65.5
THE MINIMUM IS	37
THE STANDARD DEVIATION IS	6.2585
THE COEFFICIENT OF VARIATION IS	.1253

Table C21

FILE: HDMEAN77 LIBRARY: A240ATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1977	05	01	46.0000
1977	05	02	49.0000
1977	05	03	47.5000
1977	05	04	36.5000
1977	05	05	28.5000
1977	05	06	34.0000
1977	05	07	45.5000
1977	05	08	46.0000
1977	05	09	50.5000
1977	05	10	52.0000
1977	05	11	41.0000
1977	05	12	47.5000
1977	05	13	50.0000
1977	05	14	50.0000
1977	05	15	41.5000
1977	05	16	39.0000
1977	05	17	38.0000
1977	05	18	34.5000
1977	05	19	36.5000
1977	05	20	40.5000
1977	05	21	44.5000
1977	05	22	44.5000
1977	05	23	48.5000
1977	05	24	51.0000
1977	05	25	44.5000
1977	05	26	42.5000
1977	05	27	40.0000
1977	05	28	37.0000
1977	05	29	38.0000
1977	05	30	44.5000
1977	05	31	53.0000
1977	06	01	56.0000
1977	06	02	54.5000
1977	06	03	56.0000
1977	06	04	59.5000
1977	06	05	63.5000
1977	06	06	65.5000
1977	06	07	62.5000
1977	06	08	62.0000
1977	06	09	54.5000
1977	06	10	51.5000
1977	06	11	53.5000
1977	06	12	51.5000
1977	06	13	55.5000
1977	06	14	58.0000
1977	06	15	51.5000
1977	06	16	52.0000
1977	06	17	51.5000
1977	06	18	54.0000
1977	06	19	57.0000
1977	06	20	55.5000

Table C21 (continued)

FILE: HDMEAN77 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1977	06	21	57.5000
1977	06	22	56.5000
1977	06	23	59.5000
1977	06	24	62.0000
1977	06	25	53.0000
1977	06	26	64.5000
1977	06	27	62.0000
1977	06	28	59.5000
1977	06	29	64.0000
1977	06	30	54.5000

THE MEAN IS	50.1721
THE MAXIMUM IS	65.5
THE MINIMUM IS	28.5
THE STANDARD DEVIATION IS	8.7986
THE COEFFICIENT OF VARIATION IS	.1754

Table C22

FILE: HOMEAN78 LIBRARY: A240ATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1978	05	01	40.0000
1978	05	02	41.0000
1978	05	03	42.5000
1978	05	04	34.5000
1978	05	05	36.0000
1978	05	06	38.0000
1978	05	07	35.5000
1978	05	08	39.0000
1978	05	09	45.0000
1978	05	10	47.0000
1978	05	11	42.5000
1978	05	12	42.0000
1978	05	13	48.5000
1978	05	14	54.0000
1978	05	15	56.0000
1978	05	16	53.0000
1978	05	17	40.5000
1978	05	18	40.0000
1978	05	19	46.0000
1978	05	20	51.5000
1978	05	21	49.5000
1978	05	22	51.0000
1978	05	23	49.5000
1978	05	24	50.0000
1978	05	25	38.0000
1978	05	26	41.0000
1978	05	27	43.5000
1978	05	28	47.5000
1978	05	29	49.5000
1978	05	30	39.0000
1978	05	31	38.5000
1978	06	01	45.0000
1978	06	02	47.5000
1978	06	03	50.5000
1978	06	04	51.5000
1978	06	05	53.0000
1978	06	06	56.5000
1978	06	07	55.0000
1978	06	08	54.0000
1978	06	09	57.0000
1978	06	10	57.0000
1978	06	11	47.5000
1978	06	12	52.5000
1978	06	13	57.0000
1978	06	14	57.5000
1978	06	15	56.5000
1978	06	16	44.0000
1978	06	17	50.5000
1978	06	18	50.5000
1978	06	19	51.0000
1978	06	20	50.0000

Table C22 (continued)

FILE: HDMEAN78 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1978	06	21	56.5000
1978	06	22	55.0000
1978	06	23	56.0000
1978	06	24	55.0000
1978	06	25	52.5000
1978	06	26	49.0000
1978	06	27	57.0000
1978	06	28	59.5000
1978	06	29	54.0000
1978	06	30	60.0000

THE MEAN IS	48.3197
THE MAXIMUM IS	64
THE MINIMUM IS	34.5
THE STANDARD DEVIATION IS	7.0835
THE COEFFICIENT OF VARIATION IS	.1451

Table C23

FILE: HOMEAN79 LIBRARY: A240ATA VOLUME: VOL555

SITE HEJGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1979	05	01	43.0000
1979	05	02	41.0000
1979	05	03	41.0000
1979	05	04	44.0000
1979	05	05	48.5000
1979	05	06	42.0000
1979	05	07	33.5000
1979	05	08	35.0000
1979	05	09	35.5000
1979	05	10	36.5000
1979	05	11	41.5000
1979	05	12	41.5000
1979	05	13	46.5000
1979	05	14	46.0000
1979	05	15	52.5000
1979	05	16	50.0000
1979	05	17	50.0000
1979	05	18	50.5000
1979	05	19	48.0000
1979	05	20	47.5000
1979	05	21	54.5000
1979	05	22	52.0000
1979	05	23	55.0000
1979	05	24	55.5000
1979	05	25	55.0000
1979	05	26	53.0000
1979	05	27	57.5000
1979	05	28	51.5000
1979	05	29	37.0000
1979	05	30	36.5000
1979	05	31	40.0000
1979	06	01	45.5000
1979	06	02	47.5000
1979	06	03	55.0000
1979	06	04	57.0000
1979	06	05	57.0000
1979	06	06	54.0000
1979	06	07	37.0000
1979	06	08	40.5000
1979	06	09	46.5000
1979	06	10	53.5000
1979	06	11	59.0000
1979	06	12	56.5000
1979	06	13	60.5000
1979	06	14	62.0000
1979	06	15	51.5000
1979	06	16	51.0000
1979	06	17	55.0000
1979	06	18	52.0000
1979	06	19	43.0000
1979	06	20	52.0000

Table C23 (continued)

FILE: HDMEAN79 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1979	06	21	50.0000
1979	06	22	48.0000
1979	06	23	53.5000
1979	06	24	55.0000
1979	06	25	62.0000
1979	06	26	62.0000
1979	06	27	58.5000
1979	06	28	62.0000
1979	06	29	65.5000
1979	06	30	65.0000

THE MEAN IS	49.8197
THE MAXIMUM IS	65.5
THE MINIMUM IS	33.5
THE STANDARD DEVIATION IS	8.0799
THE COEFFICIENT OF VARIATION IS	.1626

Table C24

FILE: HOMEAN30 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1980	05	01	50.0000
1980	05	02	47.0000
1980	05	03	48.0000
1980	05	04	49.5000
1980	05	05	48.0000
1980	05	06	50.5000
1980	05	07	51.0000
1980	05	08	46.5000
1980	05	09	45.0000
1980	05	10	40.5000
1980	05	11	37.5000
1980	05	12	40.5000
1980	05	13	43.0000
1980	05	14	48.0000
1980	05	15	47.0000
1980	05	16	46.5000
1980	05	17	49.5000
1980	05	18	48.0000
1980	05	19	50.5000
1980	05	20	54.0000
1980	05	21	56.5000
1980	05	22	57.5000
1980	05	23	55.5000
1980	05	24	46.0000
1980	05	25	39.5000
1980	05	26	37.5000
1980	05	27	41.0000
1980	05	28	46.0000
1980	05	29	46.5000
1980	05	30	45.5000
1980	05	31	44.0000
1980	06	01	45.5000
1980	06	02	47.0000
1980	06	03	42.0000
1980	06	04	41.0000
1980	06	05	46.5000
1980	06	06	45.5000
1980	06	07	45.5000
1980	06	08	54.5000
1980	06	09	56.5000
1980	06	10	60.5000
1980	06	11	58.5000
1980	06	12	53.5000
1980	06	13	51.0000
1980	06	14	54.5000
1980	06	15	48.5000
1980	06	16	51.0000
1980	06	17	57.0000
1980	06	18	60.0000
1980	06	19	58.5000
1980	06	20	60.0000

Table C24 (continued)

FILE: HOMEAN80 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1980	06	21	61.5000
1980	06	22	61.0000
1980	06	23	59.0000
1980	06	24	52.0000
1980	06	25	58.0000
1980	06	26	59.0000
1980	06	27	57.5000
1980	06	28	50.0000
1980	06	29	56.0000
1980	06	30	59.0000

THE MEAN IS	50.2459
THE MAXIMUM IS	61.5
THE MINIMUM IS	37.5
THE STANDARD DEVIATION IS	6.5432
THE COEFFICIENT OF VARIATION IS	.1302

Table C 25

FILE: HOMEAN81 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1981	05	01	53.0000
1981	05	02	55.5000
1981	05	03	41.0000
1981	05	04	42.0000
1981	05	05	44.0000
1981	05	06	42.5000
1981	05	07	40.0000
1981	05	08	35.5000
1981	05	09	40.5000
1981	05	10	44.5000
1981	05	11	33.0000
1981	05	12	33.0000
1981	05	13	38.5000
1981	05	14	44.0000
1981	05	15	44.0000
1981	05	16	43.0000
1981	05	17	45.0000
1981	05	18	46.5000
1981	05	19	47.5000
1981	05	20	47.5000
1981	05	21	45.0000
1981	05	22	45.0000
1981	05	23	48.5000
1981	05	24	51.0000
1981	05	25	52.5000
1981	05	26	49.0000
1981	05	27	51.0000
1981	05	28	52.5000
1981	05	29	54.0000
1981	05	30	58.5000
1981	05	31	58.0000
1981	06	01	50.5000
1981	06	02	50.5000
1981	06	03	55.0000
1981	06	04	48.0000
1981	06	05	55.0000
1981	06	06	58.0000
1981	06	07	55.0000
1981	06	08	50.0000
1981	06	09	47.5000
1981	06	10	51.5000
1981	06	11	52.5000
1981	06	12	51.0000
1981	06	13	44.0000
1981	06	14	38.5000
1981	06	15	46.5000
1981	06	16	47.5000
1981	06	17	41.5000
1981	06	18	45.5000
1981	06	19	55.0000
1981	06	20	56.0000

Table C25 (continued)

FILE: HDMEAN81 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1981	06	21	56.5000
1981	06	22	58.5000
1981	06	23	59.0000
1981	06	24	57.0000
1981	06	25	62.0000
1981	06	26	66.5000
1981	06	27	61.0000
1981	06	28	54.0000
1981	06	29	55.5000
1981	06	30	61.5000

THE MEAN IS	49.4426
THE MAXIMUM IS	66.5
THE MINIMUM IS	33
THE STANDARD DEVIATION IS	7.3587
THE COEFFICIENT OF VARIATION IS	.1488

Table C26

FILE: HOMEAN82 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1982	05	01	43.5000
1982	05	02	44.5000
1982	05	03	41.5000
1982	05	04	23.0000
1982	05	05	26.5000
1982	05	06	41.5000
1982	05	07	36.5000
1982	05	08	32.5000
1982	05	09	30.5000
1982	05	10	32.5000
1982	05	11	38.5000
1982	05	12	35.5000
1982	05	13	37.5000
1982	05	14	41.5000
1982	05	15	45.0000
1982	05	16	48.0000
1982	05	17	44.5000
1982	05	18	50.0000
1982	05	19	31.0000
1982	05	20	33.0000
1982	05	21	42.0000
1982	05	22	50.0000
1982	05	23	47.5000
1982	05	24	47.0000
1982	05	25	48.0000
1982	05	26	55.0000
1982	05	27	41.0000
1982	05	28	42.0000
1982	05	29	29.5000
1982	05	30	31.5000
1982	05	31	31.5000
1982	06	01	39.5000
1982	06	02	45.5000
1982	06	03	49.0000
1982	06	04	45.5000
1982	06	05	43.5000
1982	06	06	44.5000
1982	06	07	42.5000
1982	06	08	42.0000
1982	06	09	44.0000
1982	06	10	50.5000
1982	06	11	50.5000
1982	06	12	55.0000
1982	06	13	58.5000
1982	06	14	54.5000
1982	06	15	56.0000
1982	06	16	55.5000
1982	06	17	52.5000
1982	06	18	52.5000
1982	06	19	54.5000
1982	06	20	54.5000

Table C26 (continued)

FILE: HOMEAN82 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1982	06	21	53.0000
1982	06	22	57.0000
1982	06	23	56.5000
1982	06	24	57.5000
1982	06	25	53.5000
1982	06	26	57.5000
1982	06	27	58.5000
1982	06	28	62.0000
1982	06	29	63.5000
1982	06	30	60.0000

THE MEAN IS	45.7459
THE MAXIMUM IS	63.5
THE MINIMUM IS	23
THE STANDARD DEVIATION IS	9.653
THE COEFFICIENT OF VARIATION IS	.211

Table C27

FILE: HOMEAN83 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1983	05	01	40.0000
1983	05	02	41.0000
1983	05	03	41.5000
1983	05	04	44.0000
1983	05	05	40.5000
1983	05	06	38.0000
1983	05	07	43.0000
1983	05	08	45.0000
1983	05	09	38.5000
1983	05	10	23.5000
1983	05	11	32.0000
1983	05	12	26.5000
1983	05	13	34.0000
1983	05	14	34.5000
1983	05	15	37.5000
1983	05	16	36.5000
1983	05	17	35.0000
1983	05	18	38.5200
1983	05	19	42.5000
1983	05	20	47.0000
1983	05	21	47.5000
1983	05	22	49.0000
1983	05	23	51.0000
1983	05	24	52.0000
1983	05	25	54.0000
1983	05	26	54.5000
1983	05	27	56.5000
1983	05	28	59.0000
1983	05	29	59.0000
1983	05	30	55.0000
1983	05	31	47.0000
1983	06	01	50.0000
1983	06	02	49.5000
1983	06	03	49.0000
1983	06	04	50.0000
1983	06	05	51.0000
1983	06	06	52.0000
1983	06	07	49.5000
1983	06	08	53.0000
1983	06	09	51.5000
1983	06	10	54.5000
1983	06	11	54.0000
1983	06	12	43.0000
1983	06	13	47.0000
1983	06	14	48.0000
1983	06	15	50.5000
1983	06	16	51.5000
1983	06	17	55.5000
1983	06	18	53.5000
1983	06	19	48.0000
1983	06	20	49.0000

Table C27 (continued)

FILE: HDMEAN83 LIBRARY: A24DATA VOLUME: VOL555

SITE HEBGEN DAM
DATA DESCRIPTION MEAN DAILY TEMPERATURE
DATA UNITS: DEGREES F

YEAR	MONTH	DAY	DATA
1983	06	21	48.5000
1983	06	22	55.5000
1983	06	23	56.5000
1983	06	24	56.0000
1983	06	25	56.0000
1983	06	26	57.5000
1983	06	27	53.0000
1983	06	28	54.5000
1983	06	29	56.5000
1983	06	30	55.5000

THE MEAN IS ---------- 47.8528
THE MAXIMUM IS ---------- 63
THE MINIMUM IS ---------- 26.5
THE STANDARD DEVIATION IS ------- 8.1377
THE COEFFICIENT OF VARIATION IS - .1701

Table C28

Hebgen Dam's 3-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of [1/] Degree Days For Sequence
1983	56.5 59.0 59.0	58.16	78.5

Notes:

1/ Base temperature = 32°F

8M087.1130/0559H

Table C29

Hebgen Dam's 7-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of [1/] Degree Days For Sequence
1983	52.0		
	54.0		
	54.5		
	56.5		
	59.0		
	59.0		
	55.0	55.71	166.0

Notes:

1/ Base temperature = 32°F

Table C30

Hebgen Dam's 14-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of 1/ Degree Days For Sequence
1979	52.5		
	50.0		
	50.0		
	50.5		
	48.0		
	47.5		
	54.5		
	52.0		
	55.0		
	55.5		
	55.0		
	53.0		
	57.5		
	51.5	52.32	284.5

Notes:

1/ Base temperature = 32°F

8M087.1130/0559H

Table C31

Hebgen Dam's 14-Day "Average" Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature[1/] Sequence, °F	Moving Average For Sequence, °F	Number of[2/] Degree Days For Sequence
1979	53.5		
	54.5		
	51.5		
	51.0		
	53.5		
	43.5		
	39.5		
	40.5		
	45.5		
	43.5		
	43.5		
	49.5		
	50.0		
	52.0	47.96	223.5

Notes:

1/ Represents the "average" maximum temperature sequence for May during the record period 1970-83. The "average" maximum condition occurred in 1972.

2/ Base temperature = 32°F

Table C32

Hebgen Dam's 3-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of [1/] Degree Days For Sequence
1970	64.0 64.0 69.5	65.83	101.5

Notes:
1/ Base temperature = 32°F

8M087.1130/0559H

Table C33

Hebgen Dam's 7-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of 1/ Degree Days For Sequence
1974	63.0		
	64.5		
	69.0		
	63.5		
	60.5		
	63.0		
	64.5	64.00	224.0

Notes:
1/ Base temperature = 32°F

8M087.1130/0559H

Table C34

Hebgen Dam's 14-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of 1/ Degree Days For Sequence
1974	59.5		
	63.0		
	64.5		
	69.0		
	63.5		
	60.5		
	63.0		
	64.5		
	56.5		
	57.0		
	61.0		
	63.0		
	63.0		
	63.0	62.21	422.9

Notes:
1/ Base temperature = 32°F

8M087.1130/0559H

Table C35

Hebgen Dam's 21-Day Maximum Temperature Sequence
-May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of [1/] Degree Days For Sequence
1974	51.0		
	54.5		
	59.5		
	59.5		
	63.0		
	64.5		
	69.0		
	63.5		
	60.5		
	63.0		
	64.5		
	56.5		
	57.0		
	61.0		
	63.0		
	63.0		
	56.0		
	60.0		
	61.5		
	60.0	60.64	601.4

Notes:
1/ Base temperature = 32°F

8M087.1130/0559H

Table C36

Hebgen Dam's 28-Day Maximum Temperature Sequence
-May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F	Moving Average For Sequence, °F	Number of 1/ Degree Days For Sequence
1977	56.0		
	59.5		
	63.5		
	65.5		
	62.5		
	62.0		
	54.5		
	51.5		
	53.5		
	51.5		
	55.5		
	58.0		
	51.5		
	52.0		
	51.5		
	54.0		
	57.0		
	55.5		
	57.5		
	56.5		
	59.5		
	62.0		
	53.0		
	64.5		
	62.0		
	59.5		
	64.0		
	54.5	57.42	711.8

Notes:
1/ Base temperature = 32°F

8M087.1130/0559H

Table C37

Shower Falls' 3-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature[1/] Sequence, °F	Moving Average For Sequence, °F	Number of[2/] Degree Days For Sequence
1983	49.5 52.0 52.0	51.17	57.51

Notes:

1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

Table C38

Shower Falls' 7-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature[1] Sequence, °F	Moving Average For Sequence, °F	Number of[2] Degree Days For Sequence
1983	45.0		
	47.0		
	47.5		
	49.5		
	52.0		
	52.0		
	48.0	48.71	117.0

Notes:

1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

Table C39

Shower Falls' 14-Day Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature[1] Sequence, °F	Moving Average For Sequence, °F	Number of[2] Degree Days For Sequence
1979	45.5		
	43.0		
	43.0		
	43.5		
	41.0		
	40.5		
	47.5		
	45.0		
	48.0		
	48.5		
	48.0		
	46.0		
	50.5		
	44.5	45.32	186.5

Notes:

1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

Table C40

Shower Falls' 14-Day "Average" Maximum Temperature Sequence

-May-

Year of Occurrence	Maximum Temperature Sequence, °F [1/]	Moving Average For Sequence, °F	Number of Degree Days [2/] For Sequence
1979	46.5		
	47.5		
	44.5		
	44.0		
	46.5		
	36.5		
	32.5		
	33.5		
	38.5		
	36.5		
	36.5		
	42.5		
	43.0		
	45.0	40.96	125.5

Notes:

1/ Represents the "average" maximum temperature sequence for May during the record period 1970-83. The "average" maximum condition occurred in 1972. The tabulated values reflect the 7°F lapse correction for Hebgen Dam to Shower Falls.

2/ Base temperature = 32°F

8M087.1130/0559H

Table C41

Shower Falls' 3-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature[1] Sequence, °F	Moving Average For Sequence, °F	Number of[2] Degree Days For Sequence
1970	57.0 57.0 62.5	58.83	80.5

Notes:
1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

Table C42

Shower Falls' 7-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F [1/]	Moving Average For Sequence, °F	Number of Degree Days For Sequence [2/]
1974	56.0		
	57.5		
	62.0		
	56.5		
	53.5		
	56.0		
	57.5	57.00	175.0

Notes:

1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

Table C43

Shower Falls' 14-Day Maximum Temperature Sequence
-June and May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F [1/]	Moving Average For Sequence, °F	Number of Degree Days For Sequence [2/]
1974	52.5		
	56.0		
	57.5		
	62.0		
	56.5		
	53.5		
	56.0		
	57.5		
	49.5		
	50.0		
	54.0		
	56.0		
	56.0		
	56.0	55.21	325.0

Notes:

1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

Table C44

Shower Falls' 21-Day Maximum Temperature Sequence
-May Plus June-

Year of Occurrence	Maximum Temperature Sequence, °F [1/]	Moving Average For Sequence, °F	Number of Degree Days For Sequence [2/]
1974	44.0		
	47.5		
	52.5		
	52.5		
	56.0		
	57.5		
	62.0		
	56.5		
	53.5		
	56.0		
	57.5		
	49.5		
	50.0		
	54.0		
	56.0		
	56.0		
	49.0		
	53.0		
	54.5		
	53.0	53.64	454.5

Notes:
1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

Table C45

Shower Falls' 28-Day Maximum Temperature Sequence
-May Plus June-

Year of Occurrence	Maximum Temperature[1/] Sequence, °F	Moving Average For Sequence, °F	Number of[2/] Degree Days For Sequence
1977	49.0		
	52.5		
	56.5		
	58.5		
	55.5		
	55.0		
	47.5		
	44.5		
	46.5		
	44.5		
	48.5		
	51.0		
	44.5		
	45.0		
	44.5		
	47.0		
	50.0		
	48.5		
	50.5		
	49.5		
	52.5		
	55.0		
	46.0		
	57.5		
	55.0		
	52.5		
	57.0		
	47.5	50.43	516.0

Notes:

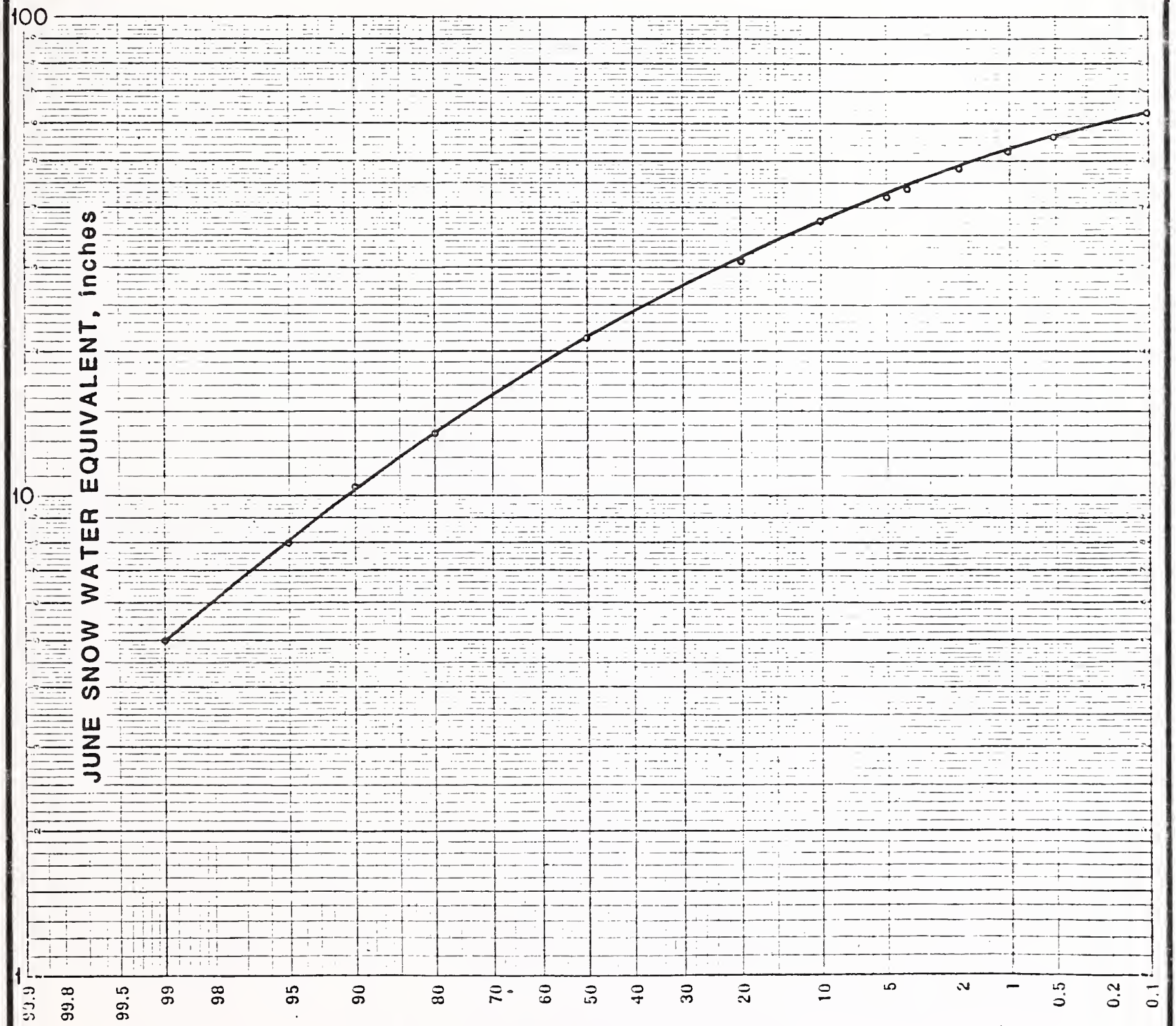
1/ Subtracted 7°F from Hebgen Dam data for lapse rate correction.

2/ Base temperature 32°F

8M087.1130/0559H

APPENDIX D - SNOW DATA

APPENDIX D - FIGURES



STUDY TECHNIQUE :

Shower Falls June Snow Water Equivalent Data Extended Using Hyalite Creek Streamflow Data.

Probability Results Based On Log – Pearson III Technique.

WEIGHTED SKEW = -0.61

MIDDLE CREEK DAM
JUNE SNOW WATER EQUIVALENT FREQUENCY CURVE FOR SHOWER FALLS

8M087.113

NOVEMBER 1983

FIGURE D1

HKM ASSOCIATES
ENGINEERS ——— PLANNERS

APPENDIX D - TABLES

Table D1

Snow Survey Station Index

Station Name	Station Number	Elevation ft, NGVD	Years of Record[1/] SD[2/]	SWE[3/]	Temp	Precip
Arch Falls	10 D 14	7350	21	21		
Devils Slide	10 D 04	8100	49	49		
Hood Meadow	10 D 03	6600	49	49		
Lick Creek	10 D 13	6860	20	20	20	18
Shower Falls	10 D 16	8100	19	19	18	18

Notes:

1/ Years of measured record used in the Middle Creek Dam Flood Hydrology Study. Note: Not all years have a complete record.
2/ SD = Snow Depth
3/ SWE = Snow Water Equivalent

Table D2

SNOW DEPTH

FILE -- AFSDAT7R
SITE -- ARCH FALLS
UNIT -- INCHES
NOTE -- ANY MONTH WITH ******.* INDICATES NO DATA AVAILABLE

04/12/84

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1963	******.*	******.*	******.*	38.0	39.0	6.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1964	******.*	29.0	37.0	49.0	47.0	26.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1965	******.*	46.0	46.0	52.0	44.0	38.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1966	11.0	18.0	26.0	33.0	34.0	4.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1967	18.0	32.0	42.0	53.0	58.0	20.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1968	42.0	44.0	46.0	48.0	54.0	32.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1969	25.0	37.0	38.0	38.0	34.0	1.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1970	33.0	41.0	42.0	68.0	75.0	40.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1971	28.0	36.0	41.0	55.0	57.0	33.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1972	24.0	31.0	36.0	44.0	40.0	8.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1973	21.0	27.0	28.0	52.0	56.0	23.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1974	26.0	32.0	33.0	44.0	48.0	38.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1975	28.0	42.0	43.0	58.0	64.0	59.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1976	34.0	37.0	41.0	53.0	61.0	25.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1977	12.0	18.0	25.0	38.0	22.0	0.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1978	26.0	41.0	43.0	37.0	33.0	28.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1979	24.0	30.0	40.0	39.0	43.0	23.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1980	17.0	26.0	32.0	49.0	26.0	9.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1981	7.0	10.0	15.0	29.0	18.0	6.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1982	23.0	32.0	35.0	56.0	48.0	******.*	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
1983	24.0	22.0	31.0	42.0	35.0	25.0	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
MEAN	23.5	31.5	36.0	46.3	44.5	22.4	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
S.D.	8.5	9.5	8.0	9.5	14.5	15.6	******.*	******.*	******.*	******.*	******.*	******.*	*******.*
COEF. VAR.	.363	.301	.222	.206	.325	.697							
PERCENT OF ANNUAL MEAN	11.5%	15.4%	17.6%	22.7%	21.8%	11.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 204.5

Table D3

WATER EQUIVALENT

FILE -- AFWOAT4R
SITE -- ARCH FALLS
UNIT -- INCHES
NOTE -- ANY MONTH WITH ######.# INDICATES NO DATA AVAILABLE 04/12/84

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1963	######.#	######.#	######.#	12.7	14.1	2.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1964	######.#	6.7	10.8	14.8	16.1	10.8	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1965	######.#	11.0	14.8	15.0	16.8	17.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1966	1.9	4.2	6.4	9.3	11.6	1.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1967	3.8	8.8	12.2	16.8	18.7	9.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1968	9.7	13.5	15.0	16.5	20.3	14.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1969	5.7	10.0	11.4	11.6	11.9	.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1970	7.6	11.5	13.4	19.2	23.3	16.8	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1971	7.0	10.2	12.8	17.1	19.6	14.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1972	5.8	9.0	10.4	12.9	14.2	3.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1973	4.8	6.0	7.0	11.2	17.0	11.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1974	5.8	8.2	9.4	14.4	18.4	15.9	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1975	6.7	11.2	13.0	16.6	20.5	23.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1976	9.5	12.3	13.9	16.4	19.8	11.8	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1977	2.2	3.9	5.2	10.4	8.1	0.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1978	6.5	9.4	11.9	12.9	13.2	11.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1979	5.4	7.5	10.1	11.4	14.2	5.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1980	4.0	6.0	8.7	12.8	9.8	1.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1981	1.9	2.0	3.8	5.6	6.2	2.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1982	4.6	7.8	10.4	14.2	17.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1983	5.0	5.5	7.8	10.8	11.7	9.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
MEAN	5.4	8.2	10.4	13.5	15.3	9.1	######.#	######.#	######.#	######.#	######.#	######.#	######.#
S.D.	2.2	3.0	3.1	3.0	4.4	6.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#
COEF. VAR.	.414	.369	.303	.227	.290	.733							
PERCENT OF ANNUAL MEAN	8.7%	13.3%	16.7%	21.8%	24.7%	14.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 62.2

Table D4

SNOW DEPTH

FILE -- DSSDDAT4
SITE -- DEVIL'S SLIDE
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####### INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1935	+#######	+#######	50	+#######	64	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1936	+#######	+#######	58	+#######	43	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1937	+#######	+#######	48	+#######	68	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1938	+#######	+#######	51	+#######	52	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1939	+#######	+#######	60	66	46	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1940	+#######	+#######	48	56	63	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1941	+#######	+#######	36	43	46	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1942	+#######	+#######	60	62	64	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1943	+#######	+#######	60	59	56	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1944	+#######	+#######	42	68	57	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1945	+#######	+#######	43	66	56	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1946	+#######	+#######	61	72	56	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1947	+#######	+#######	64	75	69	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1948	+#######	+#######	71	85	81	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1949	+#######	+#######	59	67	52	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1950	+#######	+#######	52	70	82	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1951	+#######	+#######	51	64	50	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1952	+#######	+#######	66	90	58	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1953	+#######	41	54	55	64	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1954	+#######	44	50	67	58	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1955	+#######	45	49	56	64	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1956	+#######	53	61	71	68	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1957	+#######	+#######	52	62	73	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1958	+#######	46	60	66	80	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1959	+#######	55	60	78	75	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1960	+#######	45	65	77	79	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1961	+#######	33	55	58	78	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1962	+#######	55	71	80	67	44	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1963	+#######	52	72	64	66	42	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1964	+#######	49	62	83	78	57	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1965	+#######	77	73	83	77	75	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1966	19	30	46	55	63	31	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1967	30	52	67	83	89	51	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1968	73	70	76	76	88	72	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1969	38	54	58	59	58	25	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1970	53	66	67	105	116	75	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1971	42	57	66	86	96	70	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1972	38	48	57	78	68	42	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1973	32	41	42	69	85	52	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1974	43	58	56	71	84	73	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1975	42	67	66	83	93	97	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1976	51	58	61	78	94	57	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1977	26	35	48	66	48	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1978	46	69	68	64	65	69	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1979	37	44	58	59	69	58	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1980	27	39	50	69	47	40	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1981	19	30	36	53	44	40	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1982	40	54	54	87	79	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######
1983	40	38	50	70	64	67	+#######	+#######	+#######	+#######	+#######	+#######	+#######

Table D4 (continued)

SNOW DEPTH

FILE -- DSSDDAT4
SITE -- DEVIL'S SLIDE
UNIT -- INCHES
NOTE -- ANY MONTH WITH ******* INDICATES NO DATA AVAILABLE

11/02/83

MEAN	38	50	56	70	68	56	+*******	+*******	+*******	+*******	+*******	+*******	+*******
S.D.	12	12	9	11	15	17	+*******	+*******	+*******	+*******	+*******	+*******	+*******
COEF. VAR.	.333	.239	.166	.169	.229	.315							
PERCENT OF ANNUAL MEAN	11.3%	14.7%	16.7%	20.6%	20.0%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS

340.8

Table D5

WATER EQUIVALENT

FILE -- OSWEDAT5
SITE -- DEVIL'S SLIDE
UNIT -- INCHES
NOTE -- ANY MONTH WITH *****.* INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1935	*****.*	*****.*	12.2	*****.*	21.8	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1936	*****.*	*****.*	18.4	*****.*	18.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1937	*****.*	*****.*	12.3	*****.*	20.4	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1938	*****.*	*****.*	14.0	*****.*	18.5	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1939	*****.*	*****.*	17.0	20.2	18.3	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1940	*****.*	*****.*	13.5	18.8	23.8	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1941	*****.*	*****.*	9.4	12.7	15.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1942	*****.*	*****.*	18.0	21.1	20.9	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1943	*****.*	*****.*	17.9	20.2	24.9	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1944	*****.*	*****.*	11.8	16.7	18.7	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1945	*****.*	*****.*	11.1	15.3	18.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1946	*****.*	*****.*	18.6	24.3	20.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1947	*****.*	*****.*	16.4	22.7	28.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1948	*****.*	*****.*	23.9	28.6	31.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1949	*****.*	*****.*	18.6	21.4	20.4	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1950	*****.*	*****.*	12.8	19.6	25.4	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1951	*****.*	*****.*	15.7	20.5	19.7	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1952	*****.*	*****.*	21.0	28.4	26.7	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1953	*****.*	10.6	16.2	19.0	23.3	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1954	*****.*	12.3	14.4	20.6	20.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1955	*****.*	9.6	13.3	17.8	22.3	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1956	*****.*	15.0	18.6	24.0	26.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1957	*****.*	*****.*	14.2	19.1	24.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1958	*****.*	12.6	17.2	21.4	26.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1959	*****.*	14.6	19.9	28.0	30.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1960	*****.*	13.4	19.0	23.0	27.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1961	*****.*	9.2	14.4	17.1	23.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1962	*****.*	18.8	21.8	25.4	25.0	21.4	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1963	*****.*	14.6	19.8	22.4	25.2	19.5	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1964	*****.*	11.9	20.2	25.6	27.0	25.9	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1965	*****.*	21.8	26.3	29.8	32.0	35.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1966	4.0	7.2	12.2	16.4	22.2	14.5	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1967	6.6	15.2	21.4	26.8	30.2	24.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1968	17.7	22.7	26.4	28.2	35.2	33.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1969	10.0	15.9	19.3	20.2	22.0	11.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1970	13.0	19.6	24.3	32.6	40.5	34.4	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1971	13.2	18.2	23.0	29.3	35.8	31.6	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1972	9.8	14.7	18.4	23.6	26.1	20.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1973	7.8	10.7	12.6	17.5	26.4	20.7	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1974	11.3	15.2	18.7	25.5	32.4	32.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1975	10.7	18.2	21.9	24.1	33.4	40.9	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1976	14.8	19.1	22.4	27.6	32.5	27.0	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1977	6.2	9.8	12.8	19.4	18.8	11.8	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1978	12.5	17.9	21.3	23.8	27.4	30.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1979	9.4	11.9	16.0	19.3	24.6	21.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1980	6.8	11.0	14.0	19.1	19.2	14.5	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1981	5.6	6.5	10.4	13.6	15.9	16.2	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1982	10.1	15.4	17.4	25.3	30.8	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*
1983	10.0	11.8	16.0	21.1	23.4	27.1	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*	*****.*

Table D5 (continued)

WATER EQUIVALENT

FILE -- OSWEDATS
SITE -- DEVIL'S SLIDE
UNIT -- INCHES
NOTE -- ANY MONTH WITH *****.* INDICATES NO DATA AVAILABLE

11/02/83

MEAN	9.9	14.1	17.2	22.1	24.9	24.4	+*****.*	+*****.*	+*****.*	+*****.*	+*****.*	+*****.*	+*******.*
S.D.	3.4	4.1	4.1	4.5	5.6	8.3	+*****.*	+*****.*	+*****.*	+*****.*	+*****.*	+*****.*	+*******.*
COEF. VAR.	.349	.289	.243	.205	.224	.340							
PERCENT OF ANNUAL MEAN	8.8%	12.6%	15.3%	19.6%	22.1%	21.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS

113.0

Table D6

SNOW DEPTH

FILE -- HMSDEP4
SITE -- HODO MEADOW
UNIT -- INCHES
NOTE -- ANY MONTH WITH #####.# INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1935	+#####.#	+#####.#	26.0	+#####.#	29.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1936	+#####.#	+#####.#	28.0	+#####.#	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1937	+#####.#	+#####.#	24.0	+#####.#	29.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1938	+#####.#	+#####.#	27.0	+#####.#	18.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1939	+#####.#	+#####.#	35.0	29.0	7.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1940	+#####.#	+#####.#	27.0	27.0	23.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1941	+#####.#	+#####.#	23.0	16.0	11.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1942	+#####.#	+#####.#	38.0	35.0	19.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1943	+#####.#	+#####.#	39.0	32.0	10.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1944	+#####.#	+#####.#	28.0	41.0	26.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1945	+#####.#	+#####.#	25.0	34.0	26.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1946	+#####.#	+#####.#	34.0	35.0	15.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1947	+#####.#	+#####.#	35.0	40.0	29.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1948	+#####.#	+#####.#	47.0	51.0	41.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1949	+#####.#	+#####.#	38.0	42.0	11.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1950	+#####.#	+#####.#	26.0	33.0	27.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1951	+#####.#	+#####.#	29.0	36.0	24.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1952	+#####.#	+#####.#	47.0	56.0	11.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1953	+#####.#	20.0	29.0	26.0	24.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1954	+#####.#	26.0	25.0	40.0	18.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1955	+#####.#	26.0	30.0	37.0	30.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1956	+#####.#	32.0	35.0	33.0	24.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1957	+#####.#	+#####.#	28.0	31.0	32.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1958	+#####.#	34.0	40.0	39.0	39.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1959	+#####.#	30.0	31.0	40.0	29.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1960	+#####.#	22.0	36.0	31.0	20.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1961	+#####.#	20.0	28.0	29.0	28.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1962	+#####.#	31.0	40.0	42.0	27.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1963	+#####.#	33.0	40.0	35.0	30.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1964	+#####.#	23.0	39.0	46.0	32.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1965	+#####.#	42.0	42.0	51.0	32.0	17.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1966	+#####.#	15.0	23.0	25.0	19.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1967	+#####.#	29.0	37.0	50.0	42.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1968	41.0	33.0	38.0	41.0	42.0	2.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1969	21.0	33.0	33.0	32.0	24.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1970	36.0	39.0	40.0	63.0	64.0	26.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1971	26.0	33.0	35.0	44.0	42.0	2.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1972	20.0	28.0	30.0	36.0	27.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1973	19.0	27.0	28.0	46.0	52.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1974	24.0	24.0	30.0	38.0	36.0	20.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1975	25.0	36.0	37.0	51.0	56.0	41.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1976	29.0	34.0	36.0	46.0	51.0	5.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1977	11.0	17.0	25.0	36.0	17.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1978	22.0	38.0	37.0	29.0	18.0	1.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1979	24.0	30.0	36.0	34.0	32.0	6.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1980	17.0	26.0	30.0	40.0	24.0	3.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1981	4.0	11.0	12.0	18.0	7.0	0.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1982	20.0	27.0	30.0	44.0	39.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1983	27.0	19.0	24.0	34.0	26.0	11.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#

Table D6 (continued)

SNOW DEPTH

FILE -- HMSDEP4
SITE -- HOOD MEADOW
UNIT -- INCHES
NOTE -- ANY MONTH WITH *****.* INDICATES NO DATA AVAILABLE

11/02/83

MEAN	22.8	28.1	32.2	37.7	27.3	7.4	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*	+*******.*
S.D.	8.7	7.5	6.8	9.2	12.9	11.5	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*	+*******.*
COEF. VAR.	.381	.267	.212	.245	.475	1.544							
PERCENT OF ANNUAL MEAN	14.7%	18.0%	20.7%	24.2%	17.5%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 155.7

Table D7

WATER EQUIVALENT

FILE -- HMSOWT4
SITE -- HOOD MEADOW
UNIT -- INCHES
NOTE -- ANY MONTH WITH ######.# INDICATES NO DATA AVAILABLE 11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1935	######.#	######.#	5.9	######.#	7.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1936	######.#	######.#	7.4	######.#	0.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1937	######.#	######.#	6.0	######.#	7.8	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1938	######.#	######.#	6.0	######.#	4.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1939	######.#	######.#	7.8	8.2	2.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1940	######.#	######.#	6.7	8.8	8.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1941	######.#	######.#	5.2	3.4	3.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1942	######.#	######.#	8.4	10.2	5.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1943	######.#	######.#	9.7	9.9	3.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1944	######.#	######.#	6.8	9.9	7.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1945	######.#	######.#	5.0	7.2	6.9	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1946	######.#	######.#	8.4	10.4	4.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1947	######.#	######.#	7.3	12.5	10.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1948	######.#	######.#	12.6	14.9	14.1	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1949	######.#	######.#	9.4	12.7	3.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1950	######.#	######.#	5.2	8.6	9.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1951	######.#	######.#	7.8	10.9	8.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1952	######.#	######.#	11.8	15.8	3.9	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1953	######.#	3.9	7.3	8.9	8.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1954	######.#	5.4	6.5	10.5	5.9	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1955	######.#	3.9	7.4	10.4	11.9	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1956	######.#	7.1	8.4	10.7	8.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1957	######.#	######.#	6.9	8.6	7.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1958	######.#	8.1	9.5	10.5	11.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1959	######.#	7.3	9.0	12.5	10.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1960	######.#	4.8	7.9	8.7	7.1	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1961	######.#	4.8	6.9	8.4	8.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1962	######.#	8.7	10.4	12.5	7.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1963	######.#	9.6	10.5	10.4	10.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1964	######.#	5.2	9.3	13.3	12.7	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1965	######.#	9.6	12.7	14.9	12.3	7.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1966	######.#	3.4	5.1	7.0	7.0	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1967	######.#	8.2	11.0	15.0	14.6	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1968	9.5	11.6	12.4	13.8	15.2	.8	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1969	4.6	8.5	9.2	9.2	8.5	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1970	8.2	11.9	12.8	18.8	22.8	10.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1971	6.4	9.1	11.2	14.7	15.5	.7	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1972	4.6	7.9	9.2	11.0	10.7	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1973	4.4	6.4	7.2	11.3	17.5	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1974	4.7	6.4	8.6	12.4	14.5	7.8	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1975	6.2	9.8	11.4	14.2	17.2	17.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1976	7.5	9.8	11.8	13.8	17.1	2.2	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1977	2.2	3.8	4.8	9.7	6.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1978	4.8	8.0	10.1	10.4	7.8	.2	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1979	5.2	7.2	9.0	9.3	10.8	1.2	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1980	3.6	6.4	8.0	11.3	8.2	.6	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1981	1.1	1.8	3.2	5.4	2.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1982	4.4	7.0	9.1	12.4	14.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#	#######.#
1983	4.3	5.2	6.1	8.9	7.8	3.8	######.#	######.#	######.#	######.#	######.#	######.#	#######.#

Table 07 (continued)

WATER EQUIVALENT

FILE -- HMSDWT4
SITE -- HOOD MEADOW
UNIT -- INCHES
NOTE -- ANY MONTH WITH ******.* INDICATES NO DATA AVAILABLE

11/02/83

MEAN	5.1	7.0	8.3	10.9	9.2	2.8	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*
S.D.	2.1	2.4	2.3	2.8	4.6	4.6	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*	+******.*
COEF. VAR.	.412	.352	.279	.265	.503	1.647							
PERCENT OF ANNUAL MEAN	11.7%	16.2%	19.3%	25.1%	21.2%	6.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 43.5

Table D8

SNOW DEPTH

FILE -- LCSNOD4R
SITE -- LICK CREEK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ******. INDICATES NO DATA AVAILABLE 04/12/84

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1964	12.	25.	47.	46.	37.	0.	******.	******.	******.	******.	******.	******.	******.
1965	22.	45.	46.	48.	26.	0.	******.	******.	******.	******.	******.	******.	******.
1966	10.	17.	31.	23.	28.	0.	******.	******.	******.	******.	******.	******.	******.
1967	22.	31.	39.	46.	34.	0.	******.	******.	******.	******.	******.	******.	******.
1968	38.	37.	38.	37.	39.	0.	******.	******.	******.	******.	******.	******.	******.
1969	19.	31.	31.	29.	14.	0.	******.	******.	******.	******.	******.	******.	******.
1970	34.	34.	35.	62.	65.	13.	******.	******.	******.	******.	******.	******.	******.
1971	24.	29.	34.	43.	39.	0.	******.	******.	******.	******.	******.	******.	******.
1972	20.	28.	31.	30.	14.	0.	******.	******.	******.	******.	******.	******.	******.
1973	16.	28.	27.	46.	56.	0.	******.	******.	******.	******.	******.	******.	******.
1974	24.	17.	26.	33.	28.	3.	******.	******.	******.	******.	******.	******.	******.
1975	25.	37.	37.	50.	56.	35.	******.	******.	******.	******.	******.	******.	******.
1976	28.	33.	35.	46.	******.	0.	******.	******.	******.	******.	******.	******.	******.
1977	10.	18.	25.	40.	12.	0.	******.	******.	******.	******.	******.	******.	******.
1978	23.	38.	39.	28.	12.	0.	******.	******.	******.	******.	******.	******.	******.
1979	26.	33.	39.	37.	32.	3.	******.	******.	******.	******.	******.	******.	******.
1980	18.	29.	36.	47.	24.	1.	******.	******.	******.	******.	******.	******.	******.
1981	6.	7.	19.	22.	7.	0.	******.	******.	******.	******.	******.	******.	******.
1982	21.	29.	32.	46.	37.	2.	******.	******.	******.	******.	******.	******.	******.
1983	36.	20.	28.	35.	27.	7.	******.	******.	******.	******.	******.	******.	******.
MEAN	21.	28.	33.	39.	30.	3.	******.	******.	******.	******.	******.	******.	******.
S.D.	8.	8.	6.	10.	15.	8.	******.	******.	******.	******.	******.	******.	******.
COEF. VAR.	.391	.315	.204	.255	.517	2.546							
PERCENT OF ANNUAL MEAN	13.8%	18.0%	21.4%	25.2%	19.5%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 157.4

Table D9

WATER EQUIVALENT

FILE -- LCSTRD4R
SITE -- LICK CREEK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ######.# INDICATES NO DATA AVAILABLE

04/12/8+

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1964	1.9	5.2	10.5	12.9	14.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1965	4.9	9.5	12.5	15.1	10.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1966	1.3	3.3	5.6	6.8	7.0	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1967	3.9	8.1	11.5	13.6	13.5	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1968	7.4	11.0	11.4	11.6	14.2	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1969	3.7	6.9	8.1	6.0	3.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1970	6.2	9.5	10.2	15.5	19.7	4.9	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1971	5.7	7.4	9.3	13.2	13.7	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1972	3.9	6.8	8.6	8.0	5.6	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1973	3.6	5.7	6.9	10.7	17.2	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1974	4.2	4.5	7.0	10.5	10.8	1.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1975	4.9	8.5	10.1	13.1	16.0	13.9	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1976	6.3	9.3	10.1	12.6	13.4	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1977	1.9	3.7	4.3	9.9	4.0	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1978	4.8	7.7	9.5	9.3	4.9	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1979	5.4	7.5	9.0	10.4	10.8	.6	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1980	3.9	6.8	8.8	12.9	9.5	.3	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1981	2.1	1.6	5.4	6.8	2.8	0.0	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1982	4.7	6.9	8.8	12.2	13.2	.4	######.#	######.#	######.#	######.#	######.#	######.#	########.#
1983	5.3	5.0	6.4	9.2	9.4	2.4	######.#	######.#	######.#	######.#	######.#	######.#	########.#
MEAN	4.2	6.7	8.6	11.0	10.6	1.1	######.#	######.#	######.#	######.#	######.#	######.#	########.#
S.D.	1.6	2.3	2.1	2.7	4.8	3.2	######.#	######.#	######.#	######.#	######.#	######.#	########.#
COEF. VAR.	.374	.354	.252	.248	.452	2.740							
PERCENT OF ANNUAL MEAN	10.1%	15.8%	20.4%	25.8%	25.1%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 42.6

Table D10

RUN DATE 04/12/84 PAGE 1

FILE: LCSTRDMR LIBRARY: A24TEMP2 VOLUME: FLOP30

SITE LICK CREEK
DATA DESCRIPTION MAY WATER EQUIVILENT
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1964	05	00	14.4000
1965	05	00	10.4000
1966	05	00	7.0000
1967	05	00	13.5000
1968	05	00	14.2000
1969	05	00	3.4000
1970	05	00	19.7000
1971	05	00	13.7000
1972	05	00	5.6000
1973	05	00	17.2000
1974	05	00	10.8000
1975	05	00	16.0000
1976	05	00	13.4000
1977	05	00	4.0000
1978	05	00	4.9000
1979	05	00	10.8000
1980	05	00	9.5000
1981	05	00	2.8000
1982	05	00	13.2000
1983	05	00	9.4000

THE MEAN IS ----------	10.695
THE MAXIMUM IS ----------	19.7
THE MINIMUM IS ----------	2.8
THE STANDARD DEVIATION IS -------	4.8386
THE COEFFICIENT OF VARIATION IS -	.4524

Table D11

FILE: LCSWTRDJ LIBRARY: A240ATA VOLUME: VOL555

SITE LICK CREEK
DATA DESCRIPTION JUNE WATER EQUIVILENT
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1964	06	00	0.0000
1965	06	00	0.0000
1966	06	00	0.0000
1967	06	00	0.0000
1968	06	00	0.0000
1969	06	00	0.0000
1970	06	00	4.9000
1971	06	00	0.0000
1972	06	00	0.0000
1973	06	00	0.0000
1974	06	00	1.0000
1975	06	00	13.9000
1976	06	00	0.0000
1977	06	00	0.0000
1978	06	00	0.0000
1979	06	00	.6000
1980	06	00	.3000
1981	06	00	0.0000
1982	06	00	.4000
1983	06	00	2.4000

THE MEAN IS	1.175
THE MAXIMUM IS	13.9
THE MINIMUM IS	0
THE STANDARD DEVIATION IS	3.2198
THE COEFFICIENT OF VARIATION IS	2.7403

Table D12

SNOW DEPTH

FILE -- SFSOAT4
SITE -- SHOWER FALLS
UNIT -- INCHES
NOTE -- ANY MONTH WITH #####.# INDICATES NO DATA AVAILABLE 11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1965	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	82.0	+####.#	+####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1966	24.0	35.0	50.0	58.0	61.0	33.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1967	33.0	55.0	68.0	83.0	84.0	53.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1968	72.0	63.0	74.0	72.0	81.0	74.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1969	41.0	59.0	59.0	60.0	55.0	27.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1970	55.0	67.0	68.0	98.0	104.0	84.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1971	44.0	59.0	69.0	87.0	93.0	79.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1972	40.0	50.0	60.0	80.0	73.0	52.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1973	36.0	45.0	48.0	70.0	90.0	60.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1974	47.0	61.0	60.0	76.0	88.0	83.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1975	45.0	70.0	67.0	85.0	99.0	99.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1976	55.0	62.0	70.0	84.0	100.0	64.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1977	30.0	41.0	56.0	76.0	51.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1978	49.0	75.0	72.0	67.0	70.0	78.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1979	44.0	47.0	63.0	63.0	73.0	65.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1980	30.0	43.0	52.0	75.0	52.0	43.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1981	21.0	33.0	40.0	59.0	48.0	45.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1982	43.0	58.0	58.0	90.0	81.0	+####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
1983	44.0	40.0	52.0	71.0	65.0	58.0	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
MEAN	41.8	53.7	60.3	75.2	76.0	64.1	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
S.D.	12.1	12.5	9.3	11.3	17.9	19.7	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+#####.#	+######.#
COEF. VAR.	.290	.233	.155	.151	.235	.307							
PERCENT OF ANNUAL MEAN	11.3%	14.5%	16.3%	20.3%	20.5%	17.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 371.2

Table D13

WATER EQUIVALENT

FILE -- SFWEOAT4
SITE -- SHOWER FALLS
UNIT -- INCHES
NOTE -- ANY MONTH WITH ######.# INDICATES NO DATA AVAILABLE 11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1965	######.#	######.#	######.#	######.#	######.#	38.4	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1966	5.3	9.8	14.1	18.5	22.5	17.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1967	7.9	16.5	21.7	28.2	29.3	27.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1968	18.7	22.5	27.2	29.0	34.0	37.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1969	11.1	17.5	21.2	23.0	23.8	13.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1970	13.3	20.7	25.2	32.4	39.5	39.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1971	13.4	20.0	24.8	30.7	35.6	36.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1972	11.4	16.0	20.5	25.2	29.8	25.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1973	9.1	12.1	14.9	18.9	28.5	25.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1974	12.3	16.1	20.5	28.3	34.6	37.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1975	11.7	19.4	22.9	24.5	36.6	42.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1976	15.5	21.1	24.5	30.1	35.3	32.5	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1977	7.6	12.0	14.7	24.0	20.5	13.0	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1978	13.8	20.2	23.9	26.1	30.3	34.6	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1979	11.7	13.7	17.7	21.4	27.7	25.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1980	7.5	12.1	15.2	21.5	22.2	17.1	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1981	6.1	6.7	11.7	15.2	17.1	19.8	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1982	11.1	16.4	19.1	26.7	32.4	28.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
1983	10.6	12.9	16.4	22.6	24.1	28.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
MEAN	11.0	15.8	19.7	24.7	29.0	28.3	######.#	######.#	######.#	######.#	######.#	######.#	######.#
S.D.	3.3	4.3	4.5	4.6	5.3	9.2	######.#	######.#	######.#	######.#	######.#	######.#	######.#
COEF. VAR.	.307	.275	.229	.187	.216	.324							
PERCENT OF ANNUAL MEAN	8.5%	12.3%	15.3%	19.2%	22.6%	22.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

SUM OF MONTHLY MEANS 129.0

Table D14

RUN DATE 11/02/83 PAGE 1

FILE: SFWEDATM LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION MAY WATER EQUIVILENT
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1965	05	00	*MISSING*
1966	05	00	22.5000
1967	05	00	29.3000
1968	05	00	34.0000
1969	05	00	23.8000
1970	05	00	39.5000
1971	05	00	35.6000
1972	05	00	29.8000
1973	05	00	28.5000
1974	05	00	34.6000
1975	05	00	36.6000
1976	05	00	35.3000
1977	05	00	20.5000
1978	05	00	30.3000
1979	05	00	27.7000
1980	05	00	22.2000
1981	05	00	17.1000
1982	05	00	32.4000
1983	05	00	24.1000

THE MEAN IS	29.1
THE MAXIMUM IS	39.5
THE MINIMUM IS	17.1
THE STANDARD DEVIATION IS	6.3095
THE COEFFICIENT OF VARIATION IS	.2168

Table D15

FILE: SFWEDATJ LIBRARY: A24DATA VOLUME: VOL555

SITE SHOWER FALLS
DATA DESCRIPTION JUNE WATER EQUIVILENT
DATA UNITS: INCHES

YEAR	MONTH	DAY	DATA
1965	06	00	38.4000
1966	06	00	17.6000
1967	06	00	27.6000
1968	06	00	37.6000
1969	06	00	13.0000
1970	06	00	39.3000
1971	06	00	36.5000
1972	06	00	25.3000
1973	06	00	25.6000
1974	06	00	37.5000
1975	06	00	42.6000
1976	06	00	32.5000
1977	06	00	13.0000
1978	06	00	34.6000
1979	06	00	25.2000
1980	06	00	17.1000
1981	06	00	19.8000
1982	06	00	28.2000
1983	06	00	28.2000

THE MEAN IS	28.4
THE MAXIMUM IS	42.6
THE MINIMUM IS	13
THE STANDARD DEVIATION IS	9.2189
THE COEFFICIENT OF VARIATION IS	.3246

Table D16

Prediction Equation for Shower Falls
Snow Water Equivalent

Equation[1/]	Coef. of Correlation	Coef. of Determination	Standard Error of Estimate	Total Common Data Points
Y=-3.023 +0.0029X	0.80	0.64	5.78	18

Notes:

1/ Y variable is Shower Falls June SWE and
X variable is the June streamflow for East and West Forks of Hyalite Creek combined.

Table D17

"Extended" Shower Falls Snow Water Equivalent Data
- June -

Year	Water Equivalent, inches
1931	12.0
1932	29.8
1933	23.1
1934	2.2
1935	23.0
1936	6.5
1937	14.4
1938	17.4
1939	11.3
1940	19.4
1941	10.5
1942	17.1
1943	23.5
1944	23.1
1945	19.3
1946	14.0
1947	23.7
1948	26.7
1949	15.2
1950	19.7
1951	9.5
1952	23.4
1953	22.2
1954	16.7
1955	22.1
1956	19.2
1957	26.4
1958	13.7
1959	34.3
1960	22.8
1961	14.5
1962	19.7
1963	23.0
1964	26.5
1965	38.4
1966	17.6
1967	27.6
1968	37.6
1969	13.0
1970	39.3

Table D17 (continued)

"Extended" Shower Falls Snow Water Equivalent Data
- June -

Year	Water Equivalent, inches
1971	36.5
1972	25.3
1973	25.6
1974	37.5
1975	42.6
1976	32.5
1977	13.0
1978	34.6
1979	25.2
1980	17.1
1981	19.8
1982	28.2
1983	28.2

APPENDIX E - SOILS DATA

SOIL MOISTURE DATA

- LICK CREEK STATION -

Table E1

SOIL MOISTURE

FILE -- LCSMOIST
SITE -- LICK CREEK
UNIT -- INCHES
NOTE -- ANY MONTH WITH ####.## INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1965	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	####.##	12.67	12.68	+#####.##
1966	12.27	+####.##	11.95	14.80	18.99	18.69	18.72	17.35	16.49	17.70	18.30	18.25	+#####.##
1967	18.35	18.12	18.63	19.06	18.87	19.90	18.65	17.22	15.10	+####.##	18.26	17.62	+#####.##
1968	17.71	17.76	18.05	17.80	18.19	17.14	18.08	11.62	16.99	17.94	17.22	17.18	205.68
1969	17.21	17.12	16.95	17.14	17.23	17.85	+####.##	15.99	14.33	15.12	18.35	17.32	+#####.##
1970	+####.##	17.08	17.12	17.26	14.79	17.45	16.60	16.37	18.02	18.59	17.62	17.74	+#####.##
1971	+####.##	16.99	17.17	17.36	17.47	17.40	17.60	14.42	16.61	15.90	17.03	17.22	+#####.##
1972	16.83	16.78	17.18	17.47	18.00	17.88	17.64	14.97	11.40	12.12	17.83	14.93	193.03
1973	14.66	14.09	13.58	16.42	15.40	18.10	+####.##	12.52	11.38	12.51	13.22	15.64	+#####.##
1974	15.08	14.36	14.28	14.63	17.49	14.90	16.25	13.29	12.15	12.02	12.27	12.87	169.59
1975	13.17	+####.##	13.31	13.41	15.79	15.81	14.65	14.95	12.70	12.02	16.33	+####.##	+#####.##
1976	14.24	14.27	14.19	14.49	14.76	14.95	14.36	13.79	10.59	15.54	14.61	13.51	169.30
1977	+####.##	12.69	12.31	11.85	14.41	15.01	14.01	12.88	13.81	13.97	13.82	13.84	+#####.##
1978	13.84	13.78	13.76	13.98	14.09	13.90	+####.##	+####.##	+####.##	+####.##	+####.##	+####.##	+#####.##
MEAN	15.33	15.73	15.26	15.82	16.57	16.84	16.65	14.61	14.17	14.85	15.96	15.73	184.40
S.D.	2.06	1.89	2.29	2.09	1.75	1.77	1.78	1.86	2.52	2.51	2.30	2.07	18.02
COEF. VAR.	.134	.120	.150	.132	.106	.105	.107	.127	.178	.168	.144	.131	.097
PERCENT OF ANNUAL MEAN	8.2%	8.4%	8.1%	8.4%	8.8%	9.0%	8.9%	7.8%	7.6%	7.9%	8.5%	8.4%	
SUM OF MONTHLY MEANS													187.6

Table E2

SOIL MOISTURE CONDITION AS A % OF CAPACITY

FILE -- LCSOICAP
SITE -- LICK CREEK
UNIT -- PERCENT
NOTE -- ANY MONTH WITH ****.** INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
1965	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	67.39	67.44	+******.**
1966	65.26	+****.**	63.56	78.72	101.01	99.36	99.57	92.23	87.71	94.14	97.34	97.07	+******.**
1967	97.60	96.38	99.09	101.38	100.37	105.85	99.20	91.59	80.31	+****.**	97.12	93.72	+******.**
1968	94.20	94.46	96.01	94.68	96.75	91.17	96.17	61.80	90.37	95.42	91.59	91.38	1094.04
1969	91.54	91.06	90.15	91.17	91.64	94.94	+****.**	85.05	78.88	90.42	97.60	92.12	+******.**
1970	+****.**	90.85	91.06	91.80	78.67	92.81	88.29	87.07	95.85	98.88	93.72	94.36	+******.**
1971	+****.**	90.37	91.32	92.34	92.92	92.55	93.61	76.70	88.35	84.57	90.58	91.59	+******.**
1972	89.52	89.25	91.38	92.92	95.74	95.10	93.82	79.62	60.63	64.46	94.84	79.41	1026.75
1973	77.97	74.89	72.23	87.34	81.91	96.27	+****.**	66.59	60.53	66.54	70.31	83.19	+******.**
1974	80.21	76.38	75.95	77.81	93.03	79.25	86.43	70.69	64.62	63.93	65.26	68.45	902.07
1975	70.05	+****.**	70.79	71.32	83.98	84.09	77.32	79.52	67.55	63.93	86.86	+****.**	+******.**
1976	75.74	75.90	75.47	77.07	78.51	79.52	76.38	73.35	56.32	82.65	77.71	71.86	900.53
1977	+****.**	67.50	65.47	63.03	76.64	79.84	74.52	68.51	73.45	74.30	73.51	73.61	+******.**
1978	73.61	73.29	73.19	74.36	74.94	73.93	+****.**	+****.**	+****.**	+****.**	+****.**	+****.**	+******.**
MEAN	81.57	83.67	81.21	84.15	88.16	89.59	88.59	77.73	75.38	79.02	84.91	83.63	980.85
S.D.	11.00	10.09	12.22	11.16	9.35	9.41	9.48	9.92	13.42	13.35	12.27	11.04	95.87
COEF. VAR.	.134	.120	.150	.132	.106	.105	.107	.127	.178	.168	.144	.131	.097
PERCENT OF ANNUAL MEAN	8.2%	8.4%	8.1%	8.4%	8.9%	9.0%	8.9%	7.8%	7.6%	7.9%	8.5%	8.4%	
SUM OF MONTHLY MEANS													997.7

SOIL TEMPERATURE DATA

- LICK CREEK STATION -

Table E3

SOIL TEMPERATURE

SOIL UNIT #1 DETAILS
Range of Depth, In = 0-6
Depth of Unit, In. = 3
Soil Texture 1

FILE -- LCSTEMPE
SITE -- LICK CREEK - UNIT #1
UNIT -- DEGREES F
NOTE -- ANY MONTH WITH ####### INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1965	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	38	33
1966	32	+#######	32	32	32	46	65	65	60	43	39	34
1967	32	31	33	33	32	37	62	62	65	+#######	32	31
1968	30	31	31	32	32	41	59	67	55	45	37	34
1969	30	30	28	32	32	48	+#######	59	53	44	36	34
1970	+#######	34	32	32	32	32	58	58	45	36	29	34
1971	+#######	28	30	32	29	35	52	57	44	41	36	35
1972	33	32	32	32	44	48	52	55	52	40	36	32
1973	32	31	32	32	32	38	+#######	54	47	41	37	35
1974	+#######	33	32	32	33	40	55	56	59	47	38	32
1975	32	+#######	32	32	32	32	52	60	47	43	35	+#######
1976	34	33	32	32	32	47	52	57	55	45	36	33
1977	+#######	31	31	32	32	51	55	60	52	41	37	35
1978	36	34	32	32	34	40	+#######	+#######	+#######	+#######	+#######	+#######
MEAN	32	31	31	32	32	41	56	59	52	42	35	33
S.D.	1	1	1	0	3	6	4	3	6	3	2	1
COEF. VAR.	.057	.057	.040	.008	.106	.154	.082	.066	.121	.071	.074	.039
PERCENT OF ANNUAL MEAN	6.7%	6.6%	6.5%	6.7%	6.8%	8.5%	11.7%	12.3%	11.0%	8.8%	7.4%	7.0%

SUM OF MONTHLY MEANS 481.5

Table E4

SOIL TEMPERATURE

SOIL UNIT #2 DETAILS
Range of Depth, In. = 6-14
Depth of Unit, In. = 10
Soil Texture = 1

FILE -- LCSTEMU2
SITE -- LICK CREEK - UNIT #2
UNIT -- DEGREES F
NOTE -- ANY MONTH WITH ####### INDICATES NO DATA AVAILABLE

11/02/83

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1965	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	+#######	38	35
1966	33	+#######	32	32	31	49	54	60	55	42	39	36
1967	34	32	33	36	34	40	52	56	54	+#######	37	33
1968	32	34	32	32	35	40	50	56	51	46	39	35
1969	31	30	27	33	32	44	+#######	58	52	48	35	35
1970	+#######	34	32	33	34	35	52	52	43	39	30	36
1971	+#######	29	30	32	33	36	52	56	48	42	38	36
1972	35	35	34	35	44	50	49	56	52	42	35	37
1973	35	33	34	34	35	40	+#######	53	49	45	42	36
1974	35	36	35	36	37	41	55	57	55	48	39	35
1975	34	+#######	34	33	35	36	50	58	51	46	42	+#######
1976	36	36	36	36	38	49	53	55	55	49	40	35
1977	+#######	32	31	32	39	51	59	61	58	49	43	40
1978	40	39	39	42	40	48	+#######	+#######	+#######	+#######	+#######	+#######
MEAN	34	33	33	34	35	42	52	56	51	45	38	35
S.D.	2	3	2	2	3	5	2	2	3	3	3	1
COEF. VAR.	.071	.090	.089	.081	.100	.131	.055	.045	.076	.075	.091	.046
PERCENT OF ANNUAL MEAN	7.0%	6.8%	6.7%	6.9%	7.3%	8.7%	10.6%	11.4%	10.5%	9.1%	7.7%	7.2%

SUM OF MONTHLY MEANS 494.2

Table E5

Hydrologic Soil Group Summary

Area By Hydrologic Soil Group
(Acres)

Map Unit[1/]	A	B	C	D
82-2B		67	68	
87-2C		26		
82-2B		43	44	
34-4B		564		
66-1A		33	33	34
35-2C		120		
71-1D		229		
34-4B		80		
86-2C		24	24	
82-2B		232	232	
35-2C		227		
71-1A		102	102	
66-1A		6	7	7
87-2B		41		
35-3A		311		
25-3A		41		
93-1A	51			
22-1C		315	315	
35-3B		69		
93-1A	123			
25-3A		317		
22-1C		149	150	
25-3A		42		
22-1C		150	151	
22-1C		104	104	
93-1A	96			
25-3A		143		
22-1C		20	20	
22-1C		58	58	
93-1A	161			
25-3A		547		
93-1A	63			
22-1C		52	53	
35-3A		910		
34-3A		484		
35-3B		368		
22-1C		451	452	
22-1C		627	628	
93-1A	32			
25-3A		33		
35-3A		188		
25-3A		79		

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Table E5 (continued)

Map Unit[1]	A	B	C	D
93-1A	90			
22-1C		459	500	
93-1A	233			
25-3A		372		
35-3A		239		
22-1C		108	108	
22-3A		186	186	
22-1C		158	159	
93-1A	105			
22-1C		5	5	
54-3F		1168		
34-3B		905		
35-3B		23		
35-3B		118		
53-3C		155		
86-2D		93	94	
34-3B		1171		
Reservoir[2]				
22-1C		11	12	
22-1C		24	24	
82-2B		13	14	
12-2B		23		
TOTAL[2]	954	12,483	3,543	41 = 17,021 Ac = 26.6 sm
Percent of Total	5.6%	73.4%	20.8%	0.2%

Notes:

1. Reference: Gallatin Forest Area, Soil Survey, Montana, Forest Service (Unpublished; obtained from Bozeman office).

2. Does not include 200 acres of reservoir area

General: To determine weighted average soil group, make the following numeric assignments to the soil groups: 1 for Group A, 2 for Group B, 3 for Group C, and 4 for Group D. Expand the data as follows:

	954	12,483	3,543	41	
	x 1	x 2	x 3	x 4	
Total	954	24,966	10,629	164	= 36,713

Weighted Average = 36,713/17,021 = 2.16, or Soil Group B

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